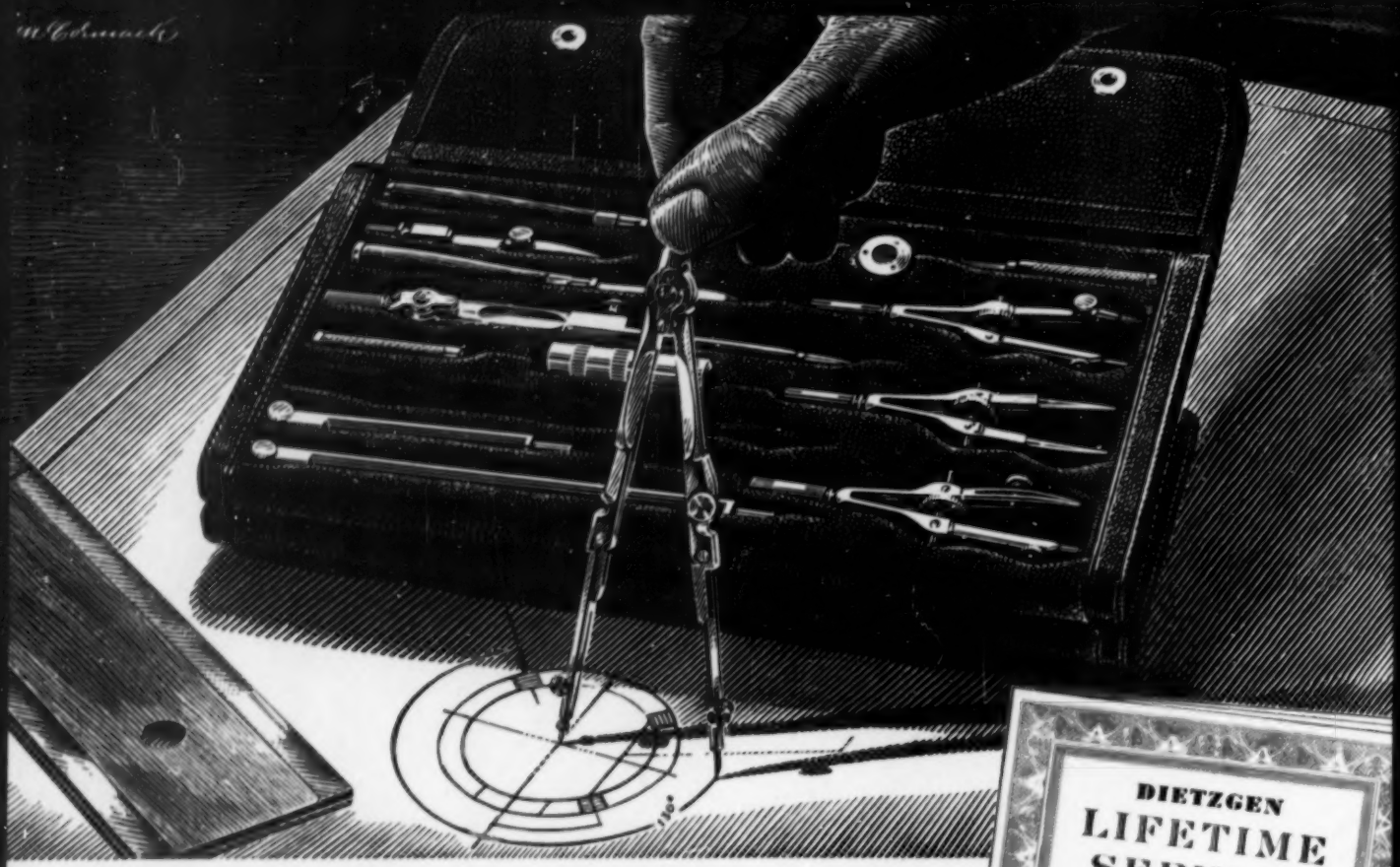
FEBRUARY, 1955 Vol. 44, No. 2

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine



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Dietzgen standardization of drawing instrument designs and the Dietzgen Lifetime Replacement and Repair Parts Policy are valued highly for the convenience and savings they assure both individual owners and volume users (educational institutions, trade schools, etc.) of Dietzgen Drawing Instruments. Lost or damaged parts can be replaced with perfectly fitting Dietzgen Repair and Replacement Parts made from the same tools and with the same skill that produced the original parts. Your Dietzgen dealer or the nearest Dietzgen branch is ready to serve you. Institutions may obtain Dietzgen Repair Parts Kits containing the parts most frequently required for servicing a quantity of sets of the same grade.

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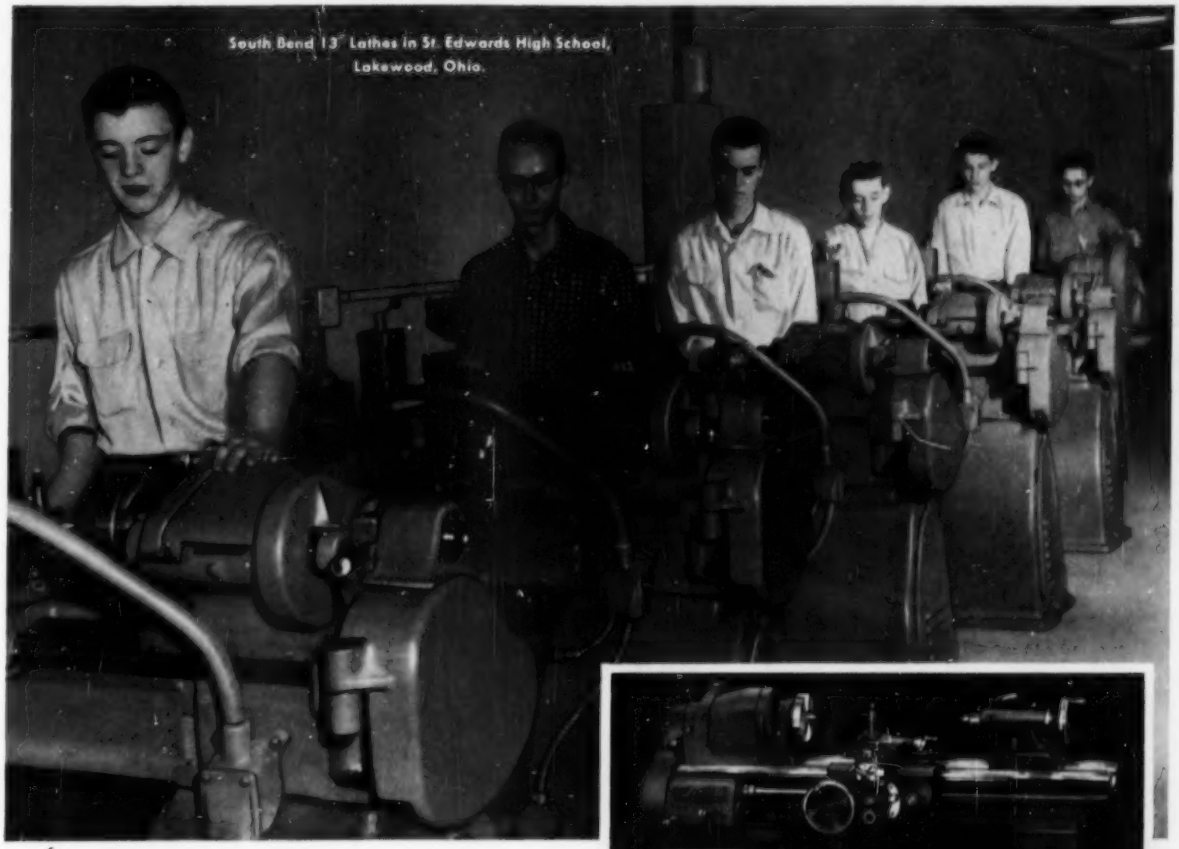
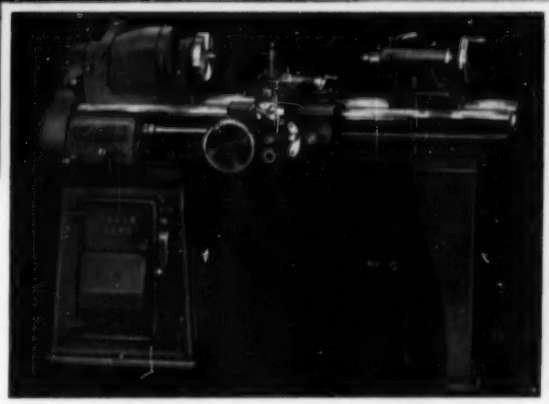

South Bend 13" Lathes in St. Edwards High School, Lakewood, Ohio.



Long-Lasting Value

Look to the future and you'll appreciate the wisdom of choosing South Bend 13" Lathes for your shop.

Year after year they dependably serve with a minimum of maintenance even under extreme conditions. They also retain their accuracy because they are designed primarily for exacting industrial use. You'll find that, dollar-for-dollar, South Bend 13" Lathes give you more actual value. Send coupon today for complete information on all of South Bend's quality-built machine tools.

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Parishioners Specify Rockwell-built **DELTA** Power Tools In Shop They Built Themselves

When parishioners of St. John The Baptist Catholic Church in Whiting, Indiana, selected power tools for their woodworking shop, they decided—as have 67% of America's public and parochial schools—on the safety, economy, and ease of operation of Delta Power Tools.

Instructor demonstrates correct use of a Delta 24" Scroll Saw. "The boys are only beginners, but we've had no accidents at all," reports St. John's pastor.

According to Father Lefko, pastor of St. John's when the shop was built, "We've found Delta Tools to be very safe and efficient. They make possible a complete range of projects, and maintenance is negligible."

This shop is unique not only because of its completeness and efficiency, but because the parishioners *built it themselves* on donated time. It was built to combine wholesome fun with first class industrial arts instruction. The students are first trained on hand tools; the opportunity to work on the Delta tools forming a kind of reward for increased ability. Originally intended for school-age boys, the shop so interested the boys' fathers that one extra evening a week had to be reserved for them!

And, as an added bonus, the Delta-equipped shop now provides the church with complete maintenance and repair facilities.

Delta Power Tools are not only safe, versatile and economical. But because they are the same tools used in industry, they also provide practical "on-the-job" training. Investigate the advantages of low-cost Delta Power Tools for your industrial arts program. Your Delta Dealer will be glad to arrange a demonstration. He's listed in the Classified Pages under "TOOLS" or "MACHINERY."

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☐ Please send name of my nearest Delta Dealer.

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FEBRUARY
1955

VOL. 44 NO. 2

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

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★ ★ ★ ★

This Month's Cover

Photograph made by Donald Krafft, showing a senior setting up a piece of work in the machine shop of the industrial-education department of the Arkansas Agricultural and Mechanical College, College Heights, Ark.

Submitted by Ray Wallis, instructor of industrial education.

★ ★ ★ ★

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ASSOCIATION NEWS

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crafts and plastics, Columbia High School, Richland, Wash.; gave excellent demonstrations on how they conduct their industrial-arts classes in photography and lapidary work.

Other sections on Saturday afternoon were devoted to graphic arts in general education, and auto mechanics and transportation, technological changes in woodworking, and new developments in electronics.

On Sunday morning the industrial-arts division held its business session.

Shriver L. Coover presided. Reports on various activities were made by Joseph Schad, Blacksburg, Va.; John A. Jarvis, Menomonie, Wis.; G. Harold Silvius, Detroit, Mich.; Chris H. Groneman, College Station, Tex.; and Lynne C. Monroe, Santa Barbara, Calif.

Another session on Sunday morning discussed the work of the industrial-arts supervisor on the local and state levels.

The Sunday afternoon session was devoted to discussions of the industrial-arts program in the elementary grades 1 to 6, and in the colleges.

Louis V. Newkirk, Chicago, Ill., acted as chairman. William G. Knife, Santa Barbara, Calif., spoke on objectives of elementary industrial arts.

Heber A. Sotzin, San Jose, Calif., chose for his talk the content of industrial arts in grades 1 to 3; Frank C. Moore, Cleveland, Ohio, discussed the content of industrial arts, grades 4 to 6. Methods of teaching elementary industrial arts was presented by John T. Newell, Chicago, Ill.; Wayne Champion, San Jose, Calif.; and Bethel Fry, San Jose, Calif.

William J. Micheels, University of Minnesota, presided at another meeting on Sunday afternoon at which the curriculum in college industrial arts was discussed.

John A. Jarvis, Menomonie, Wis., the first speaker, called attention to the fact that placement calls, and supervisor and teacher opinions influence what the industrial-arts curriculum should be at a teachers college.

He stated that quite a large percentage of Stout graduates had to teach other subjects besides industrial arts. That teachers must be urged to make their teaching so that it captures the student's interest.

M. Ray Karnes, University of Illinois, Urbana, discussed the subject from the graduate master's degree angle.

Members of a panel that spoke on this subject were H. H. London, Columbia, Mo.; Verne L. Pickens, Kansas City, Mo.; and William R. Williams.

At the Monday morning meeting Chris H. Groneman, College Station, Texas, acted as chairman.

O. E. Kjos, Havre, Mont., in talking on the subject of occupational experience and success of day-trade vs. general high school graduates, expressed the opinion that we must give more help to the skilled and technical groups.

Otho J. Quick, Charleston, Ill., chose for his remarks the teaching and nonteaching first degree graduates with industrial-arts majors.

Maurice F. Richards, Santa Barbara, Calif., said that we ought to put more emphasis on teaching our students the need for both speed and accuracy in teaching drafting.

E. Robert Rudiger, Menomonie, Wis., in his remarks on educational needs and interests of people concerning the selection, operation, and care of the automobile, pointed out that students should know more about the operation and care of the automobile. Also that they should know when adjustments must be made rather than know how to make them. And they should all know how to drive properly.

H. O. Schorling, Fresno, Calif., in summarizing the discussions, stated that we in industrial arts must do much more serious research work than we have done in the past.

About 18,000 experimental studies have been made in reading alone, while we in industrial arts can point to only 100.

To improve our curriculum we must choose our future teacher candidates more carefully, and they must more thoroughly study the problems that confront us.

The chairman at the Monday morning session was Howard A. Campion, Los Angeles, Calif. This meeting was a joint session on industrial arts and trade and industrial education and comprehensive industrial education program.

Walter R. Williams, Tallahassee, Fla., traced the history of education and its effects on the people in Japan, China, and our own country.

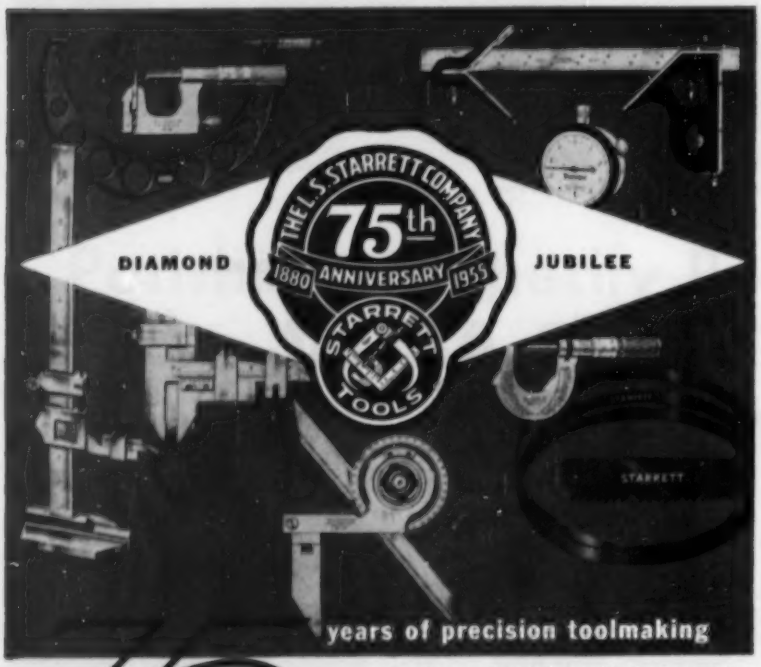
He emphasized that now that the machine is dominant, the schools must recognize it in their curriculums. The general shop, proper library facilities, materials laboratories, films, and the co-ordination of industrial arts with the other educational offerings point the direction in which we are and must continue to advance in training our youth.

While all of the industrial-arts sessions were going on, an equal number of meetings were slated by groups teaching agriculture, business, distributive education, guidance, home economics, T and I subjects, and by the National Association of State Supervisors of T and I education and by the National Association of Industrial Teacher Educators.

The House of Delegates meeting was held on Tuesday morning with President Mark Nichols presiding.

The new officers elected for the coming year are: president, Cecil E. Stanley, Nebraska

(Continued on page 8A)



75

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HERE's one of the first of the new series of Walker-Turner LIGHT-HEAVYWEIGHTS—the improved 10" Tilting Arbor Saw *you* asked for!

Designed into it are the features you want. Greater stability. Clean, modern design. Sturdiness. More weight. Better balance. But wait until you see it in action—it's *then* that you'll appreciate the carefully engineered safety features, the conveniently-placed easier acting controls, and particularly the feel-of-confidence that its LIGHT-HEAVYWEIGHT construction imparts to students.

Ask for a demonstration of this brand new LIGHT-HEAVYWEIGHT. Your factory-trained Distributor will be glad to oblige; you'll find him listed under "TOOLS" in the yellow pages of your local Telephone Directory. It may pay you well to give him a call—today.

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RADIAL SAWS • JIG SAWS • LATHES • SPINDLE SHAPERS • JOINTERS
BELT AND DISC SURFACERS • FLEXIBLE SHAFT MACHINES

Safety Sam says:

...for maximum

specify the big

The ATLAS heavy-duty, precision Jointer-Planer is designed and built to handle more work in less time . . . with better finish and accuracy . . . and with MAXIMUM SAFETY! Its many outstanding safety and convenience features, illustrated and described on the right-hand page of this advertisement, make it the ideal jointer-planer for both teachers and students in school shop work.

The foundation of the superior performance of the ATLAS is the result of the precision construction of its massive grey-iron tables and fence, and big solid steel precision cutter-head.

HEART OF ATLAS JOINTER
Cutter-head-spindle is machined from a solid bar of fine-grained steel, then precision ground—2½" in diameter, the head alone weighs 10 lbs. . . . another reason why an ATLAS cuts more smoothly.

The tables are ground simultaneously (after they are assembled to the base) to *align to within .005" throughout their entire 42" length.* To save you time, the rear table is stationary for permanent, accurate alignment with the head. The front table travels ½" on carefully machined ways . . . large, convenient knob controls depth of cut, shown on easy-to-read scale, and a clamp lock anchors it in position.

The famous ATLAS fence is a heavy grey-iron casting 4½" x 32" long, actually larger than many 6" jointer tables. Fence tilts 45° both ways . . . slides smoothly on machined ways . . . one movement of lock lever anchors it rigidly in place or releases it for quick positioning or removal.

The cutter-head-spindle is one piece — precision ground for perfect balance. Close tolerance machining of slots and grinding of blades eliminate tedious shimming. Head turns on sealed-for-life ball bearings for smooth, quiet operation, and years of service.

Before you order a jointer-planer see this big 6" ATLAS at your nearest ATLAS Dealer's!

Belt and Disc Sander

24" Jig Saw

Spindle Shaper

10" Floor Saw

15" Drill Presses

12" Wood Lathe

both teachers and students can DO so much MORE so much BETTER with Atlas tools

BELT AND DISC SANDER . . . Sands any width boards . . . angles, curves, edges. Sealed-for-life ball bearings. 10" dia. disc and 4" belt. Tilt table works with both belt and disc.

24" JIG SAW . . . Smoothest ever designed . . . exclusive new drive is the secret of its vibrationless operation! Big 14" x 14" table tilts on widely spaced trunnions, indexes 90°. Universal chucks!

SPINDLE SHAPER . . . Extra heavy 15" x 21" precision table moves two inches up or down. Stationary spindle with sealed-for-life ball bearings! Integral motor mount.

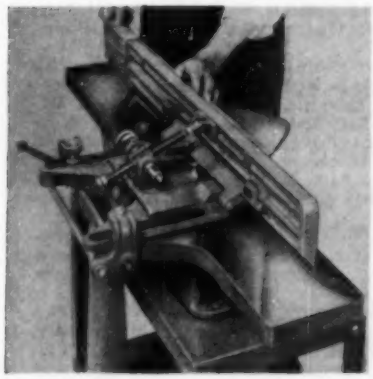
10" FLOOR SAW . . . Massive precision table, with grill-type extensions available. Big sealed-for-life ball bearings. Quick, easy blade-tilt and height controls. Famed ATLAS exclusive double-locking lift-off fence.

15" DRILL PRESSES . . . Bench or floor models . . . high or slow speed. Floating drive with exclusive, silent, life-time Nylon drive sleeve. Sealed-for-life ball bearings.

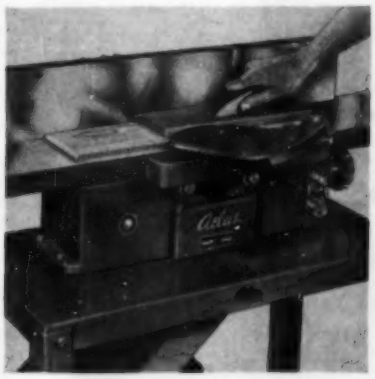
12" WOOD LATHE . . . Ruggedly built for smooth running, with every feature essential to efficiency and accuracy. Sealed-for-life ball bearings, lever controlled bed locks for tailstock and tool rest.

safety with unequalled accuracy, finish and ease of operation

Atlas 6" JOINTER-PLANER



CUTTER-HEAD COMPLETELY GUARDED
The ATLAS cutter-head is guarded both *sides* of the fence for complete safety! Front table blade guard has spring mechanism for setting to desired tension, releases instantly for removing guard. Fence slide bracket always covers rear portion of cutter-head back of fence.



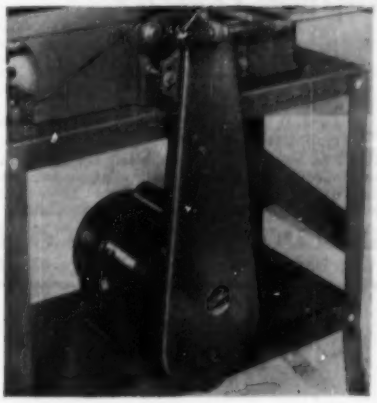
PLANES THIN STOCK SAFELY
The big ATLAS fence always touches the rear table . . . thin stock can't slide under the fence after it passes the cutter-head, as it can in ordinary jointers . . . an exclusive safety factor you get only with ATLAS!

SAFE END-JOINTING
The height of the big ATLAS fence (4½") keeps one's hands away from the cutter-head on end jointing operations . . . gives firmer support for edging work. Fence is rigidly supported at three points close to cutter-head . . . right where the cutting is done.

LINE UP ONE BLADE AND ALL ARE ALIGNED
Cutter-head screw jacks on both sides of the base assure quick, accurate positioning of cutter-head and blades with rear table. Cutter-head slots are machined to within .001" tolerance and blades ground in sets to the same tolerance . . . saves teacher many hours positioning blades or replacing them after sharpening. No shimming required.

HANDLES WIDE BOARDS WITH GREATER SAFETY
The rear table widens to a full 12" and fence lock bracket swings out of way beneath table to make it *safer* and *easier* to plane wide boards. The front table widens 2" for *safer*, firmer support on all rabbeting operations.

PULLEYS AND BELT FULLY GUARDED
The ATLAS belt guard safely covers belt and pulleys as required by industrial and vocational codes. Thick cast aluminum, it bolts rigidly to the jointer base.



WRITE FOR ILLUSTRATED LITERATURE

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CLAUSING HEAVY DUTY MACHINE TOOLS
(Quality Machine Tools Since 1911)

ASSOCIATION NEWS

(Continued from page 4A)

State Supervisor of Distributive Education and Nebraska Assistant State Director of Vocational Education.

He succeeds Mark Nichols, Utah State Director of Vocational Education.

Vice-president for business education, Arthur L. Walker, Virginia State Supervisor of Business Education; vice-president for agriculture, R. E. Bass, Virginia State Supervisor of Agricultural Education.

Roy Fairbrother, Wisconsin state supervisor of distributive education, was elected to fill Mr. Stanley's term as AVA vice-president for distributive education.

Charles W. Sylvester, Baltimore, Md., assistant superintendent of schools in charge of vocational education, goes into his twenty-eighth year as AVA treasurer.

M. D. Mobley is executive secretary of the American Vocational Association, with headquarters in Washington, D. C.

The Ship's Program, held Tuesday afternoon, was a huge success. Naturally everyone who could possibly make it was in attendance. The Ship's treasure chest held a large number of worth-while prizes, as might be imagined when there were over 125 commercial exhibitors.

The Ship's Citation was presented to Claude Eugene Nihart, who is now the head of the industrial-arts teacher education department at the Los Angeles State College, Los Angeles, Calif.

The 48th annual vocational convention, held in San Francisco, Calif., attracted over 3000 educators and laymen from business, industry, labor, farm, and home groups. The five-day meeting included over 150 meetings of special interest to vocational and practical-arts educators.

The 49th Annual Vocational Convention is scheduled for Atlantic City, N. J., December 5–9, 1955. The American Vocational Association's Golden Anniversary Convention will be held in St. Louis, Mo., the first week in December, 1956.

COMING CONVENTIONS

Feb. 26–Mar. 2. American Association of School Administrators, at Kiel Auditorium, St. Louis, Mo. Executive secretary, Dr. Worth McClure, AASA, 1201 — 16th St. N.W., Washington 6, D. C.

Mar. 3–5. Illinois Vocational Association, at Hotel Jefferson, St. Louis, Mo. Secretary, Paul R. Waugh, Board of Education, Peoria, Ill.

Mar. 17–19. Indiana Industrial Education Association, at Purdue Memorial Union Bldg., West Lafayette, Ind. Secretary, H. G. McComb, 215 State House, Indianapolis, Ind.

Mar. 17–19. New Jersey Vocational and Arts Association, at Berkeley-Carteret Hotel, Asbury Park, N. J. Secretary, Mrs. Hazel N. DeCamp, 8 Mountain View Place, Irvington 11, N. J.

Mar. 17–19. Ohio Industrial Arts Association, at Neil House, Columbus, Ohio. Secretary, C. R. Hawes, 423 Pine St., Greenville, Ohio.

Mar. 18–19. California Industrial Education Association, at San Diego, Calif. Secretary, Lee D. Bodkin, 131 Education Bldg., University of California, Los Angeles, Calif.

NEW MEXICO INDUSTRIAL ARTS ASSOCIATION

The program of the New Mexico Industrial Arts Association was scheduled during the annual meeting of the New Mexico Educational Association held in Albuquerque, October 28 and 29, 1954. The NMIAA met with the New Mexico Vocational Association to hear Mr. Nichols, president of the American Vocational Association. Mr. Nichols' speech concerned vocational education on the national and state levels. The meeting was well attended.

A proposed constitution was presented to the members of the NMIAA. The constitution was revised and accepted. The meeting was conducted by Worth Long, Albuquerque, president for 1953–54. Incoming president for 1954–55, Dr. Albert A. Bettina, of the Eastern New Mexico University, reported on the 1954 spring meeting of the American Industrial Arts Association. Lawrence Fredrick of New Mexico Western University and Chester Brown of the University of New Mexico also attended the Los Angeles meeting and were asked to give further comments on the convention.

A committee of three was appointed to present an improved program of certification for teachers of industrial arts. The committee will report to the State Department of Education. Committee members were: W. R. Forkner, Hobbs, chairman, John Foster, Tucumcari, Clayton Meairs, Roswell.

Officers elected for the coming year were: Al Bettina, president, Chester Brown, vice-president, and W. R. Forkner, secretary-treasurer. Executive Board members elected were: Lawrence Fredrick, John Foster, and Elmer Kuhn, Albuquerque.

Two of the more important matters of the business meting concerned the vote to raise the dues and the vote to become affiliated with the American Industrial Arts Association.

(Continued on page 14A)

SHELDON
CHICAGO U. S. A.

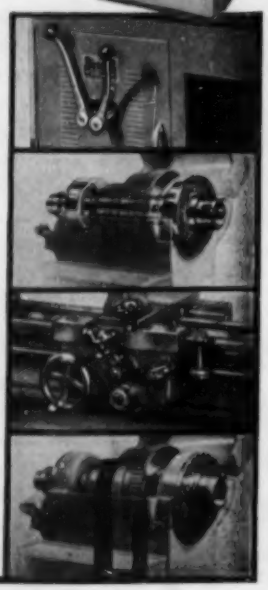
Important ★
above all else in school lathes

★ **SHELDON SAFETY**
. . . all belts, pulleys, countershafts, gears and motors are completely enclosed. Speed changes and gear-ratio changes are made by external shift levers.

★ **SHELDON PRECISION**
. . . "Zero-Precision" Tapered Roller Spindle Bearings (the absolute in accuracy) permit student work to ten-thousandths of an inch, and hold this accuracy without constant maintenance.

★ **SHELDON CONTROLS**
SHELDON-taught students are ready to operate standard industrial lathes—are familiar with standard controls and the "big lathe feel".

★ **SHELDON CAPACITY**
The extra swing and greater collet capacity increase the range of possible student projects—from the "playing store" group to the practical. The extra power to the spindle, the speed range, weight and strength of SHELDON Precision Lathes permit heavy cuts, spinning and demonstration of correct use of new cast-alloy and carbide-tipped cutters.



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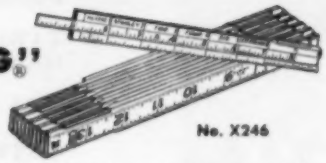

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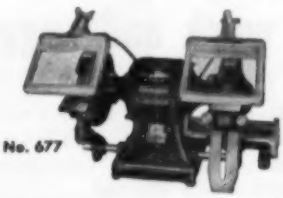

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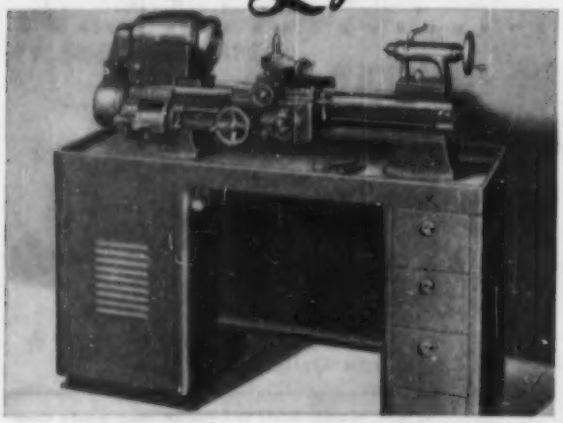

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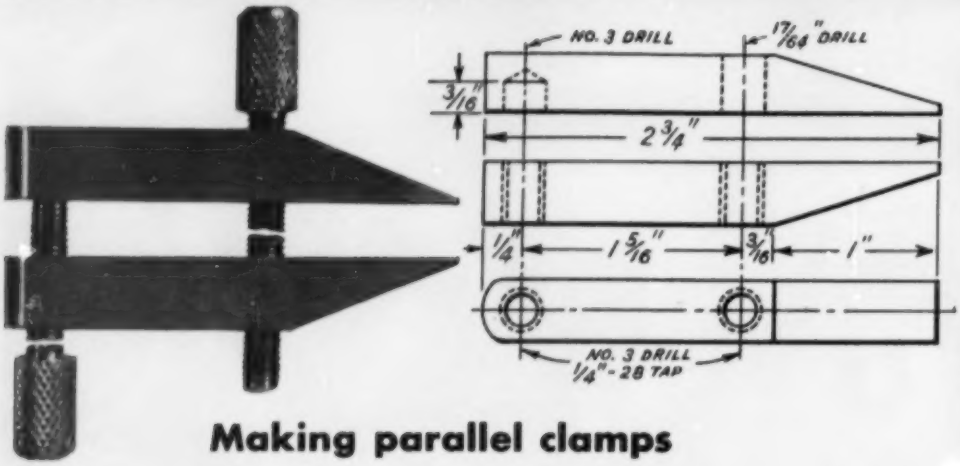
HOW-TO project for the School Shop

—by NICHOLSON FILE COMPANY

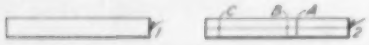
NO. 5 OF A SERIES



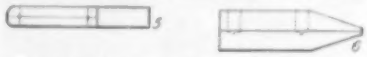
Making parallel clamps

Material: 2 pieces 7/16" sq. by 2 13/16"; 1 piece 3/8" rd. by 8" CRS. **Tools:** 10" Flat Bastard file; 10" Mill Bastard file; 10" Flat Second Cut file; 6" rule; surface gage; square; scratch-awl; center punch; hammer; 3" dividers; No. 3 and 17/64" drills; small center drill; 1" micrometer; 1/4–28 tap and die; medium knurling tool; rt. hand round-nose tool; rt. side tool; 3" outside calipers.

SCHEDULE OF OPERATIONS

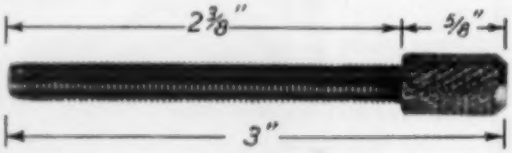


1. Square one end of each piece of stock, using 10" Flat Second Cut file. Other end may be filed square or have a 7/32" radius. Paint all sides with layout dope. **2.** Scribe center line on top of each piece using 6" rule and surface gage. Using a square, 6" rule and scratch-awl, scribe cross lines as follows (both pieces): Line A 1" from squared end; line B 1 3/16" from squared end; line C 2 1/2" from squared end. Using center punch and hammer, make light center punch mark at intersections of lines B and C with center line. Enlarge these center line punch marks to 1/16" dia. on one piece only. **3.** Turn both pieces 90° and draw a diagonal line across from the 1" line to a point 1/16" from bottom of jaw. **4.** Set each piece in vise at an angle of about 20° and file with a 10" Flat Bastard file to within 1/32" of diagonal line. Place both pieces together in vise to finish-file to lines. Care should be taken to clamp both pieces evenly in vise. Finish-file with 10" Mill Bastard file, first by straight filing, then by drawfiling. **5.** If rounded ends are preferred, place both pieces in vise together, rough-file radius with 10" Flat Second Cut file and finish-file with 10" Mill Bastard file. **6.** Note that in first drilling operation, drill is used to "spot" the lower piece only. To drill, use a drill vise, clamping both pieces at once, placing the one with the 1/16" center punch holes on top. Drill with a No. 3 drill.



Set the drill so that it will drill the top piece and spot the bottom piece. Note: a piece of blotting paper between the movable jaw and the work will help to keep both pieces in position while drilling. Remove top piece from vise and drill second piece to specifications, drilling blind hole with a No. 3 drill to 3/16" deep and body-sized hole with a 17/64" drill through block. **7.** Tap holes with 1/4–28 tap. In starting tap, check with square on two sides to ensure alignment of jaws when work is assembled. **8.** Drawfile or straight-file with diagonal strokes, using chalked 10" Mill Bastard file.

PROCEDURE FOR TURNING SCREWS



As the equipment of school shops varies, there are a number of ways these screws may be made. They may be held in either a draw-in collet, a 3-jaw Universal chuck, or they may be turned between centers. However, a chuck will be necessary to cut the center holes out of the screws. **1.** Center end in 3/8" collet to 1/8" dia. center hole. Bring work out of chuck 3 1/2", oil dead center, adjust and clamp tail stock. **2.** Knurl about 7/8" of rod nearest chuck, using cutting oil on medium knurling tool. **3.** Turn screw to .250 + .000 – .010, 2 3/8" long (taking 2 or 3 cuts to prevent shaft from springing), using a small radius rt. hand round-nose tool. Square shoulder with rt. side tool. **4.** Check with instructor as to procedure in cutting screw, if not using 1/4–28 die. **5.** Cut off work with either a cutting-off tool or hack-saw, allowing 1/32" for squaring with a rt. side tool. File 1/16" chamfer with 10" Mill Smooth file on knurled end. **6.** Cut out center hole on screw, holding work in chuck. Care should be taken to protect the thread. Make over-all length 3". Note the end of one screw is rounded; the other has a taper to fit blind hole. **7.** Make second screw same as first. File taper approx. 5/8" long on end of screw to fit blind hole, again using Mill file.

Regular Nicholson Flat Bastard and Mill Bastard files shown here in about one-third reduction.

FREE REPRINTS OF THIS PAGE

for school-shop use will be sent to school heads or instructors on individual request. Ask for "How-to Project No. 5" and give minimum number of copies you need. The files recommended in the foregoing text (made in both Nicholson and Black Diamond brands) are widely obtainable from industrial supply houses and hardware dealers.

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
FEBRUARY 1955

Mass Production in the Small Shop

WILLIAM S. REYNOLDS
State Teachers College
Oswego, N. Y.

The possibility of doing a production job in our ninth-grade shop had long been contemplated. The need for a class project of an exploratory type was evident, as this is a small town, devoted mainly to agrarian pursuits. Few of the boys had ever been inside any type of production shop; they had little or no idea of what mass production in its reality implies. When a production job was suggested to the class of 14, it met with immediate approval.

One of our first problems was to select a project suitable to production in a small industrial-arts shop. The fact that both our materials and finances were limited did not deter our aspirations. Many projects were carefully considered before the choice was narrowed to two or three small projects of wood. Of these, the final decision was for the oxcart table centerpiece — plans for which were found in an issue of Deltagram. This project had the points we were looking for: simple construction, several operations, good design and low cost. The boys suggested at the beginning that we could collect crate wood for the job, thus economizing on the new material used. The construction of the oxcart made it readily adaptable to crate wood.

After several class discussions in which many good suggestions were made, an election was held to determine who would supervise the project. The decision was for two students to supervise and plan the project in detail. These two boys met with the instructor and laid the foundation for the production job. A list was made of all operations required to build the oxcart. This list was divided into the various areas of work: getting out and squaring stock,

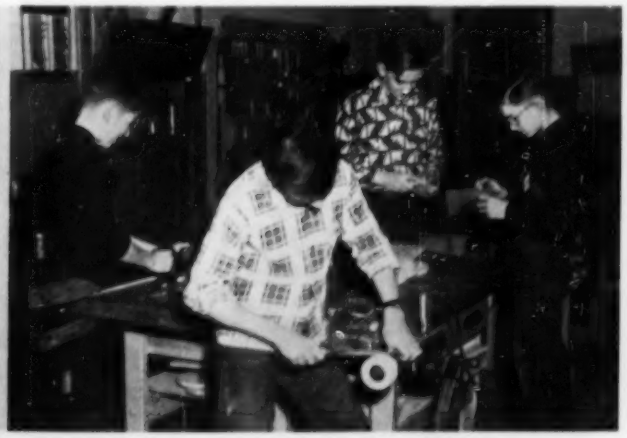
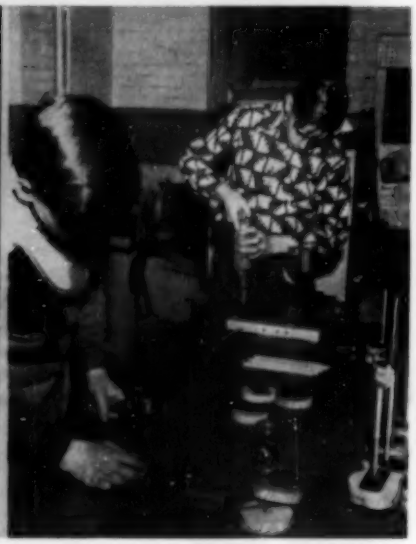


Fig. 1. Oxcart production job — 9th grade at Delmar Public School. Operation: Cutting rails. At right — Fig. 2. Planing rails, smoothing ends of rails, rounding wheels

— Photographs by David Hastings



At left — Fig. 7. Operation: Assembly of sides in jig and final inspection. At right — Fig. 3. Operations: Drilling axle in jig; assembling wheel brace and wheel

cutting pieces to size, sanding parts, assembling, and finishing. A foreman for each of these sections was needed, so another election was held.

We now had a managerial staff which met for the purpose of assigning an operation to each boy in the class. The boys were shifted from their jobs by the supervisors as the need for larger groups in various operations presented itself. A list of the operations and assignments was posted on the shop bulletin board for class reference. With plans complete, the next step was to visit the local grocery stores and ask the merchants to save their fruit crates for us. These were collected after school by the instructor and the boys.

As the crates came in they were carefully disassembled. With some crates we found it easier to saw the sides off the ends, rather than trying to pull the nails out. This procedure eliminated splitting and saved most of the wood. The ends of the crates were ideal for the base of the oxcart; the sides were suitable for the rails.

The first group to start work were the stock boys. They worked for about two days to build a stock pile of materials. The cut out group started next, and work progressed rapidly. Soon all of the groups were operating, with the pieces being passed from one group to another in simulated production style.

The boys were quick to recognize the problems that confronted them. Each problem was discussed pro and con, for much experimentation was necessary before final decisions could be made. Speed and accuracy were the goals; therefore, it was necessary to use various means to attain a resemblance of the factory system. Rapid sawing of the corner uprights and side rails was accomplished by using the simple stop block method. See Figure 1. The guard was turned back as shown, to allow the operator to see the small pieces, and to prevent them from piling up under the guard. The wheels were cut out on the jig saw, drilled in pairs and mounted on a bolt. The bolt was fastened in a portable electric drill held in a vise. With the wheels spinning, they were filed and sanded smooth, as shown in Figure 2. Lack of a lathe chuck made this drill technique necessary and it proved quite effective. The wheel braces were made of scrap mahogany plywood cut in strips, and then cut off on a curve to fit the wheel. These braces were drilled to take the axle, then fastened to the wheel with four brads — as shown in the foreground of Figure 3. Two holes were drilled in the ends of the axle dowel (to accommodate the wheel retaining pins) with a simple block guide.

Fig. 4. Operation: Assembling jig for the ends of the oxcart. All parts were glued as well as nailed

There were other methods used throughout this unit to insure our facsimile of mass production. Assembly of the oxcart ends was accomplished by using the jig, shown in Figure 4, which spaced the horizontal members and held the upright posts at the proper angle. These pieces were glued and nailed together. Parts were stored in cans to facilitate handling during the assembly operations. The assembled ends of the cart were slid into the jig shown in Figure 5. The side rails were then added, glued, and nailed in place. This completed the top part of the cart with the exception of finishing.

The bed of the cart was simple crate

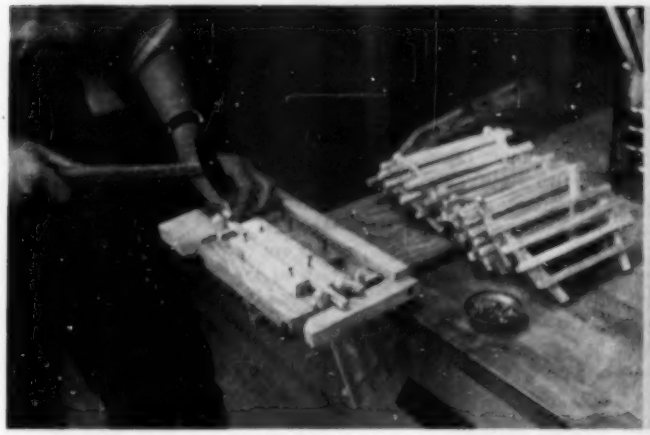


Fig. 5. Operation: Assembly jig used to assemble side rails to the ends. At right – Fig. 6. Subassembly on oxcart production job. Operations: gluing, nailing, covering nails

wood material with saw kerfs running lengthwise to imitate planks. To this bed the jig sawed handles were glued and nailed. This operation is shown in Figure No. 6. Plastic wood was used to plug the nail holes. The axle and wheels were then attached to the bed. The rail assembly was inverted, and the bed was placed on top. A finishing nail was driven through the bed and into each corner post. Glue was also used to provide strength.

Various finishing ideas, suggested by the class, were tried. The boys decided that clear shellac looked most appealing on pine. Some of the 25 carts made are shown being inspected in Figure 7. The various finishes may be noted in that illustration.

How valuable was this production job to the learning process? The answer to this question will ultimately justify or discard any shop project. These 14 boys learned a great deal from the problems which arose while working on this project. Shortage of materials, lack of parts when needed, the need for increased speed and accuracy — these were only some of the problems that the boys reported in class discussions. The students who made up the managerial staff now have some idea of the responsibility involved in the terms of industry. All of the boys found that co-operation was important to produce a final product of acceptable quality. They found that careless work resulted in scraping of parts and slowing of production.

Our production job was not only a success in teaching the problems of mass production, but it also helped our shop finances. The carts were sold to gift shops and the profits were used for equipment and supplies. The only cost involved in this unit was for the axle dowels, brads, glue, and finishing materials. Everything else was reclaimed from crates and scrap wood; consequently the class learned economy by making a salable product from inexpensive materials.

There are numerous additions which can make such a project more worth while. A time study could be instituted. Local factory men might be called in to talk to the class about wages, opportunities for advancement, and working conditions in production jobs. Student participation in every phase of the planning, and active class discussion of problems arising on the job, make the most of any project of this type. A good follow-up is to take the class on a tour of a mass production plant. We made a two-hundred mile trip to the General Motors plant in Wilmington, Del. Here the students were able to observe actual mass production which was carried out to a high degree of perfection. The learning process was complete, for they had learned both by doing and observing.

Student-Prepared Tests Motivate Learning*

C. B. RAUSCHER
Senior Training Supervisor
U. S. Naval Ordnance Laboratory
White Oak, Silver Spring, Md.

Student-prepared tests can sometimes be used as a motivating influence in achieving optimum conditions for learning. Some of the results of this method of learning are interesting and are worthy of further consideration.

At the Naval Ordnance Laboratory we were confronted with the difficult problem of teaching theory to apprentices in trades employing only one or two apprentices. Specifically, we had one apprentice each in the trades of carpenter, glass apparatus maker, letterer and grainer, plus two in the refrigeration and air conditioning mechanics fields. Because of the few men involved it was difficult to justify an instructor in each area. However, in all fairness to the apprentices we felt that the least we could do would be to organize a self-study course, using appropriate books, for each trade. About one month after the self-study program began, we checked our two refrigeration and air conditioning apprentices to see how they were progressing under this system. We found that although the

*Article submitted by Ernest S. Primoff, Head, Trades and Industrial Testing Unit, United States Civil Service Commission, Washington, D. C.

men were given definite study assignments almost no progress was evident. This was true to a greater or lesser degree in the other trades. At this point, our self-study program seemed doomed to failure. Obviously we needed a motivating stimulus.

Experimental Beginning

As an experiment, beginning with our two refrigeration and air conditioning apprentices, we decided to charge each apprentice with the responsibility of writing 40 multiple choice questions on the first two study assignments. To assist the students in this new project, we printed a set of *ground rules* which gave full instructions plus samples on how to write multiple choice questions.

Our initial results were crude but encouraging, so we decided to concentrate on improving the caliber of the questions. Gradually, with some individual help, the students became more skillful in developing thought stimulating ideas. We then felt that the men were ready to exchange papers and take each other's test. The results of persistent study and the framing of correct answers plus three or four wrong alternates to each question was reflected in the unusually high scores by both men. Finally, we arranged for the apprentices to discuss the test material with their supervisor. This again proved fruitful because controversial questions often spread among the journeymen who in one shop began discussing the issues during their lunch period. In fact, the results of our experiment have been so good that we planned to introduce this method into our formal trade theory classes on a full time basis. Why are we sold on this method? Here are some reasons based on actual experience.

1. Framing good questions on course content stimulates original thinking.

2. Framing plausible alternate answers causes the student to examine the subject matter from many viewpoints. This would not occur otherwise as a self-stimulus.

3. The incentive to contribute clever and well-prepared questions is a challenge to every student. (We let it be known that the questions would be used by future apprentices. Each completed assignment bears the author's name.)

4. Students retain what has been learned longer. We get high scores on tests which have been devised many months previously. This also provides an excellent review of course content.

5. The student often devises questions which relate theory with actual practice.

6. Supervisors can keep abreast of new ideas in discussing the tests with the apprentices.

7. If good reference books are provided many ideas can be more fully explored.

8. Based on the trend and caliber of questions, the supervisor or leader can measure the level of comprehension on the part of each student.

9. Apt students can make more rapid progress commensurate with ability. By the same token, slower students can take more time to assimilate the subject matter.

10. The fear most students associate with tests is used to advantage as a basic motivating influence. Perhaps it's because the student is in the driver's seat for a change.

Using Student-Prepared Tests in Related-Subjects Classes

Before concluding, perhaps we should mention the possibilities of using the student-prepared test method in related subjects which the apprentice studies, such as mathematics, science, and English. In mathematics and sometimes in science all questions cannot be of a multiple choice type and still achieve the desired purpose. However, as a good periodic review, the teacher can have each student write a series of questions, together with answers and solutions, on subject matter covered over a certain period. The teacher can cull these questions and develop from them a suitable battery of questions for subsequent examinations. Perhaps it would be more effective to have the students exchange questions and take each other's test. Fruitful discussions will no doubt result from this exchange because each student has actively participated in the program from two viewpoints; namely writing a test and taking one on the same subject matter. No doubt the teacher will be stimulated by some of the questions which are submitted. He will also share in a new, profitable experience from subsequent discussions among his students.

SAMPLE TEST

Letterer and Grainer Trade Theory Assignment

(Devised by Ned King, Apprentice Letterer and Grainer)

1. The most important item in the entire screen process field is:
   a) quality of paint used.
   b) mesh or fabric used.
   c) layout or design.
   d) frame construction.
   e) technique for passing squeegee across screen stencil.
2. The gauge of silk is measured by the number of meshes contained in an inch. Which, if any, of the following are correct?
   a) Silk No. 2 contains 52 meshes per inch.
   b) Silk No. 4 contains 62 meshes per inch.
   c) Silk No. 6 contains 72 meshes per inch.
   d) Silk No. 12 contains 122 meshes per inch.
   e) Silk No. 18 contains 160 meshes per inch.
   f) All are correct.
3. Which of the following is best suited for printing on small glass, metal or wood surfaces, and fine photographic work?
   a) Bolting cloth, Mesh No. 4
   b) Domestic organdy
   c) Organdy voile or imported organdy
   d) Silk No. 2 gauge
   e) Wire cloth
4. Which of the following agents would be considered the least desirable for use in washing paint from screen process fabric after a run?
   a) Linseed oil *c*) Leaded gasoline
   b) Alcohol *d*) Varsol
   e) Lacquer thinner
5. Which of the following requires more careful workmanship and attention to detail?
   a) Metal sign work
   b) Wood sign work
   c) Show card sign work
   d) Glass sign work
   e) Textile sign work
6. Select the appropriate pair of words as they would appear in the blank spaces of the following sentence: "The .... operation on any wood or card sign is the .... operation on a glass sign."
   a) first — second
   b) no appropriate pair of words
   c) third — last
   d) first — last
   e) last — third
7. Gold leaf is generally considered to be
   a) transparent.
   b) luminous.
   c) opaque.
   d) semitransparent.
   e) obtuse.
8. Which of the following, when used directly against gold leaf, would have the greatest effect in voiding the bright luster of the leaf?
   a) chrome orange
   b) lemon yellow
   c) ivory black
   d) chrome green
   e) cobalt violet
9. Which of the following colors, when used directly against gold leaf, would bring out better the luster of the gold leaf?
   a) cobalt violet
   b) chrome green
   c) lemon yellow
   d) ivory black
   e) chrome orange
10. Which of the following agents, if any,

is used for the etching of glass signs?
a) hydrochloric acid
b) acetic acid
c) nitric acid
d) hydrofluoric acid
e) acetone
f) None of them are suitable.

11. Which of the following paints or colors is least durable for use on glass?
a) ultramarine
b) yellow ocher
c) raw umber
d) blue-black
e) cobalt green

12. Which of the following agents, if any, is used for the etching of brass signs?
a) hydrofluoric acid
b) acetone
c) nitric acid
d) hydrochloric acid
e) acetic acid
f) None are suitable.

13. Which of the following pair of agents is used for the removal of the silver backing and subsequent etching on glass mirror signs?
a) nitric acid and hydrochloric acid
b) acetic acid and nitric acid
c) hydrochloric acid and hydrofluoric acid
d) acetone and nitric acid
e) hydrofluoric acid and nitric acid

14. Which of the following liquids, if any, is out of proper sequence with respect to its drying time character?
a) wearing body varnish
b) boiled linseed oil
c) Japan rubbing varnish
d) Japan gold size
e) shellac
f) None are out of order.

15. *Creeping* or *crawling* of paint is caused by which, if any, of the following?
a) rusted surface
b) greasy surface
c) too highly polished surface
d) *alligatored* surface
e) *hot spots* on plaster surfaces
f) None of these are causes.

16. Which of the following mixtures would possess the greater durability?
a) Japan color mixed with Japan gold size
b) oil color mixed with Japan gold size
c) Japan color mixed with rubbing varnish
d) oil color mixed with rubbing varnish
e) oil color mixed with finishing varnish
f) Japan color mixed with finishing varnish

17. In the following two columns are listed certain items and liquids. Which, if any, are improper, in so far as the solvent listed opposite is incorrect?
a) glue — water
b) shellac — alcohol
c) balsam of fir — turpentine
d) beeswax — alcohol
e) asphaltum — alcohol
f) Items and solvents as paired are correct.

18. Which, if any, of the following are unsuitable as sizes for use in surface gilding?
a) Japan gold size
b) rubbing varnish
c) finishing varnish
d) spar varnish
e) fat oil
f) None are unsuitable.

19. What effect, if any, has a fast dryer on a slow dryer when mixed?
a) It retards the quick dryer.
b) It has no effect whatsoever.
c) It accelerates the quick dryer.
d) It retards the slow dryer.
e) It accelerates the slow dryer.

20. What effect, if any, has a slow dryer on a fast dryer when mixed?
a) It has no effect whatsoever.
b) It retards the slow dryer.
c) It retards the quick dryer.
d) It accelerates the slow dryer.
e) It accelerates the quick dryer.

Key

Answers 1 to 13. See *Screen Process Methods of Reproduction* by Bert Zahn.

1. (b) page 25
2. (b) page 26
3. (e) page 27
4. (c) page 28
5. (d) page 82
6. (d) page 82
7. (d) page 84
8. (c) page 84
9. (e) page 84
10. (d) page 85
11. (a) page 90
12. (c) page 101
13. (e) page 103

Answers 14 to 20. See *Atkinson's Signs.*

14. (f) page 13
15. (b) page 13
16. (e) page 14
17. (e) page 17
18. (f) page 17
19. (a) page 16
20. (d) page 16

Power Tools at Archbishop Stepinac High School

ALFRED A. DeCICCO
New York City, N. Y.

The most important decision an industrial-arts teacher can make in favor of his students, whether they are in vocational or industrial-arts courses, is the selection of proper and efficient power tools that will enable them to get off to a good start in a woodworking class.

Archbishop Stepinac High School, White Plains, N. Y., possesses a comprehensive tool-equipped industrial-arts shop. The tools have been in operation since the high school was erected a little more than six years ago. They were selected with great care so students may be able to work with tools used to a great extent in industry.

By choosing power tools simple to operate, Archbishop Stepinac students have been able to get off to a good start at the beginning of a semester, Industrial-Arts Director Brother Dominic, C.F.X., points out.

According to Brother Dominic, each of the power tools is demonstrated before the students at the beginning of the semester. They are shown, for instance, that the drill press can be used not only to drill but also to route, buff, mortise, and sand.

After this demonstration, students must pass a test on each of the power tools. This demonstration aids the students for the remainder of the woodworking course, and enables them to handle power tools as well as any shop instructor would want a student to handle them.

This 14-in. Delta Drill Press is used by the students of Stepinac High School for such operations as drilling, routing, buffing, and sanding

— Delta Power Tool Photo

Class Enthusiasm

Brothers Dominic, Justin, and Sylvester teach several sizable classes each semester and find students most enthusiastic about classwork and projects.

This enthusiasm, no doubt, is due to the fact that many students have had very little opportunity to work with power tools before enrolling in the industrial-arts course. Once students learn the use of power tools and what they can do, they turn out such varied projects as modern and period-type tables, coffee tables, bookcases, etc.

Only students in their second, third, and fourth years of high school are eligible for industrial-arts shop courses. Second-year students are given a general course consisting of practical electricity, woodworking, and metalworking. When they become third-year students they may select any one of these general courses for more comprehensive study, and when four-year students they receive further study.

Besides instructional use, the power tools are used extensively by the school's maintenance crew for general repair work and cabinetmaking for classrooms. Also, about one third of the school's faculty have started woodworking hobbies, and are using the tools on week ends and after school hours for various projects.

Fig. 1. An industrial-arts student at Archbishop Stepinac High School, White Plains, N. Y., working at a 14-in. band saw. Brother Sylvester, C.F.X., instructor.

— Delta Power Tool Photo

Fig. 3. A student does edge molding on a Delta Shaper at Archbishop Stepinac High School, White Plains, N. Y.

— Delta Power Tool Photo

Fig. 2. A student of the Archbishop Stepinac High School, White Plains, N. Y., working at a 6-in. Delta Jointer

— Delta Power Tool Photo

The largest tanker built in the United States made a triumphant entry into New York Harbor amid the traditional harbor welcome. Larger than most of the passenger liners afloat today the tanker enters world charter for an oil company. With a capacity of 393,000 barrels, the new giant sets a record for the largest carrying capacity in the world. — *Petroleum Newsnotes.*

Looking For a Job?

M. W. WARREN
Waverly, N. Y.

"I am applying for an appointment at Bigtown. I had an interview with the superintendent yesterday, and he told me to file a formal written application immediately. Will you please look at this letter, and see if it is all right, before I send it out?"

The request came from a summer-session student, who stopped at the desk on his way out of class. It was quite evident that the man himself considered the request a mere polite formality, as the addressed envelope he passed over was already stamped for mailing. Inside was his "formal written application" — on a double sheet of pale pink, blue-lined note paper, then on sale at Woolworth's at ten cents a box.

That student was no immature boy — he was a Normal College graduate, past thirty, with several years of teaching experience. Temporarily classed as one of those freaks who occasionally manage to "get by" even in good schools, he was forgotten until the end of the next semester, when the superintendent came into the principal's office with a file of some thirty written applications from which to select candidates for personal interviews. A single reading eliminated every letter in that pile except one. Incidentally, the writer of that one was interviewed and accepted. The collection as a whole was so amazingly poor, and the errors were so numerous and so gross, that the entire set was analyzed and tabulated, and a collection of "horrible examples" was begun then and there.

The folder holding that constantly expanding exhibit now includes letters written on cream, white, gray, blue, pale green, light yellow, and delicate lavender note paper; on legal cap, Regents' examination paper, school tablet stock, and penmanship practice sheets; on club, fraternal society and board of education letter heads; on single and double sheets of social letter paper, lined and unlined, some with gilded edges or colored borders, and one with a cutout monogram. Eighteen came on blue-ruled tablet paper, and twenty-nine on both sides of single sheets. There was one specimen done on the first page of a folded sheet of letter paper which had been torn in two, and one bearing the printed heading of the official examination booklets used by a university in the Middle West.

A few of these letters are typed, but the majority are handwritten. Many of the penmen used black ink, but there are some letters done in green, blue, and two of them were in purple. Several are signed "Yours respectively." One ends, "Yours truly," and one man signed himself "Mr. James Booth." Twelve women write their signatures "Miss Dora Blank" without a parenthesis, and one of the dozen put a period after the Miss. "Dear sir" is a common form of salutation, and many use a semicolon after it. Several of the writers addressed the superintendent of schools simply as "John Smith, Dear Sir," omitting even the formality of Mr. More than thirty pay no attention to margins, and many of these also crowd their letters toward the top of a single page.

One man writes, "I am five foot ten inches tall," and then adds that he has taught "with marked success." Another stated, "I am enclosing my photo, and ask you to return it if I do not accept your position." His chances for appointment need have caused him no worry. Still another advertises his ability by stating, "I presume that I *can* teach Mechanical Drawing II, though I never have."

The gem of the collection is written in a big, round hand by a young woman who announces, "In June I will graduate from ———," naming a well-known eastern college, "with honor and a B.A. degree." Her letter appears on a sheet evidently torn in haste from a block tablet, the upper margin bearing a jagged edge. Instead of using a blotter, the writer had evidently dried this effusion over a gas jet, and the fact that the bottom of her letter bore a good-sized, pale brown scorch had not prevented its mailing.

There is little choice between letters signed by men and those sent in by women applicants. It was a woman

Preparing the framing which was demonstrated at a Stout Institute Wisconsin Builders Conference at which 100 construction men from Minnesota, Iowa, Illinois, and Wisconsin attended. — Shown in the illustration are the men who were the faculty hosts. From left: George Soderberg, assistant professor of finishing at Stout; Dr. Herbert Anderson, chairman of the Stout woodworking department; and K. T. Olsen, associate professor of carpentry and chairman of the conference. A special delegation of Canadian builders also attended. — Submitted by Dr. T. F. Fleming, The Stout Institute, Menomonie, Wis.

about to be granted an M.A. who forwarded a three-page, handwritten document beginning, "I am an American of good character and sound moral principles. I am five feet six inches tall, weigh 140, and have blue eyes and dark brown hair. I have a good education." After using three pages and a postscript to describe that education, she concluded: "In addition to my long-drawn-out course of training, I have had wide and varied experience in the school of life, and I am sure that I can teach young people to live and enjoy life."

Another young woman, evidently strongly convinced of her own ability, stated: "I am thorough with subject matter, and strong in discipline. I am firm but kindly, and I have a natural gift for making clear explanations. I am patient and painstaking. I have a cheerful spirit, a pleasing personality, and agreeable manners." Then she capped the climax by adding, "I am a young woman of twenty-two, and have good, clean habits."

These things would be very funny if we did not remember *that the majority of these letters were written by college graduates, and the rest by people who had completed high school plus some form of teacher training.* One thing that their schools should have taught them before sending out a single one to hunt for jobs is the fact that a letter of application is a selling letter — if it is going to do any business *it must be as perfect as possible.*

A letter of application rarely gets an appointment nowadays — what it usually brings is the chance to apply for one in person. The chances for securing a personal interview are affected by the general appearance of a candidate's letter, exactly as chances for appointment will be affected by personal grooming — and to just about the same degree. A letter of application is a formal business letter. Social note, folded letter paper, colored stationery, ruled, gilt-edged, monogrammed, club, hotel, and fraternal society paper, all are barred. The only kind of paper for such use is a good, heavy, white bond paper, typing size, and of the very best quality that money can buy. Such paper can be had by the quire at any stationer's, but the price of an entire box is a small item when compared with the loss of a desirable appointment.

Unless "Apply in own handwriting" is specified, a typed letter is advised. Every prospective teacher, no matter whether shop, home economics, or classroom, should be able to type for himself. The candidate who cannot should seek the nearest public stenographer, and have his letter written — and rewritten if necessary — until it is perfect as he can make it. Then he should buy or rent a typewriter, secure an instruction book, and go to work. An hour's daily practice will pay lifetime dividends. If you are applying for an elementary position it may be advisable to enclose a slip bearing a handwritten, "This is a specimen of my ordinary business penmanship," but just as long as three or four pages of verbose appearing, handwritten manuscript can be boiled down to a single page of easily read typed copy, the typed letter will usually produce the better impression.

A letter of application that is not perfectly satisfactory to the sender should never be mailed. The bad spot will strike the prospective employer much more unpleasantly than it does the writer. Letters containing erasures, strike-overs, uneven margins, or misspelled words should be destroyed, even if this means doing over the same letter a dozen times. If the candidate knows better, the employer is justified in concluding that he will not be careful about others' business when he is careless about his own. If he does not know better, he is unfit for appointment.

If you *must* file a handwritten letter, use black ink, write on one side of the paper only, and adopt the conventional arrangement. Include a *recent* photograph and copies of one or two letters of recommendation, not more. Type these letters, and label each "COPY" at the top. Select an envelope large enough to hold all your enclosures easily, and put in a smaller self-addressed, stamped envelope for return. Fasten your enclosures together adult fashion with a paper clip — ten cents a box at any stationer's — instead of with a pin. Never send out in a letter anything that you cannot duplicate or replace. Some superintendents will return your material; others will not.

The best kind of photograph is a small, unmounted, glossy print, like those ordered for newspaper cuts. Such photographs are inexpensive, easily mailable, and clear. Since these are often accidentally separated from the accompanying letter, put your name and address on the back of each print. The purchase of the cuts sold by some teacher agencies is not recommended. Recently a prospective Normal College graduate sent out a *printed* description of his qualifications — enough to kill his chances at once. That application was an unconscious admission that he distrusted his own chances of securing a position without broadcasting.

Do not brag, but on the other hand, do not belittle yourself. The recent graduate is advised to say, "I have had twenty weeks' experience, teaching homemaking in the tenth-grade classes of the Practice School at ——— College" instead of "I have had no experience except practice teaching." Boy or Girl Scout work, summer camp teaching, especially counselor or camp leadership, and the like may profitably be mentioned by the beginner, though the experienced candidate will naturally omit them. Army or military experience should be mentioned, especially if based on special qualifications or training.

In naming references, if you do not wish your present employer questioned unless there is almost certainty of employment, say so frankly, and give your reason. Do not name either your pastor or your family physician as a reference, as each is practically obliged to give you a good character. Naming your banker is quite a different matter. Do name school officials, especially supervisory officials who have observed your work: former teachers; foremen or supervisors under whom you have had outside experience, giving each his proper title. The more recent their association with you, the better.

Omit all mention of political or fraternal organizations to which you belong. Mention might help in a few instances, but it will hurt in a great many. In New York the candidate is forbidden to mention the church of which he is a member. A married man whose wife is a college or conservatory graduate, a former teacher, a leader in Girl Scout work, or a person with social service experience, will find it worth while to mention this in his letter, especially if he is applying for appointment in one of the smaller communities.

If you are anxious for a new appointment this year, your first step should be an honest, thoughtful consideration of the exact qualifications you have to offer; your second one, to formulate the kind of advertising letter which will help you to sell those qualifications. A study of one or more of the recent *business* English texts will probably be of some assistance.

Research — not alchemy — is turning waste straw into gold for some American farmers. *A new paper-pulping method, the mechaniochemical process,* is responsible. Developed at Northern Regional Research Laboratory, process yields more pulp from straw than normally obtained from wood. When blended with wood pulps, residue straw pulps are said to be as strong as softwood kraft pulps. Process has proved successful in commercial trials for making fine and corrugated papers and newsprint. *Consumption in U.S. — world's largest user of pulp products — has jumped 50 per cent since World War II. To meet demand, mills have been chewing up soft pulpwoods faster than forests can grow them. — Industrial Research Newsletter.*

A Time-Record Card For Machine-Shop Students

FORREST KNOSS
Department of Vocational Education
Faribault Public Schools
Faribault, Minn.

Because some kind of a student time record was needed in our Smith-Hughes machine shop classes, the following system was devised since there was no clock on which to punch in and out on different jobs. Various types of record sheets were tried with varying lack of success. In most cases the record cards did not interest the students.

While working in a general machine shop the writer had occasion to use a job record card on which were listed various machines with accompanying spaces on which to punch in and out. Immediately he realized that here might be a possible solution to the problem. Because the usual student projects and jobs require several days or periods to complete, it was found necessary to add many more spaces on the school time record cards.

These cards were used by my trade class with a great deal of interest being evinced by the students. The cards are filed in a case under each student's name and notations are made daily at the beginning and end of each period. Some students may have several cards in progress at one time.

At the end of the year these records are transferred to a master sheet which becomes the student's personal property. It serves as concrete evidence of his hours of experience in the different phases of machine shop work, and could possibly be a factor in securing a job. Basically, of course, the time-record card provides practical experience similar to that phase of time-recording in a job shop. It also serves as a means whereby the instructor can compare students on the amount of time required to complete various jobs.

TIME-RECORD CARD
VOCATIONAL MACHINE SHOP
FARIBAULT HIGH SCHOOL

Job ..... *JAP WRENCH* .....

Customer ..... *SELF* .....

Date Started *Jan. 7, 1952* Date Finished *Feb. 1, 1952*

	Hours	Minutes
Shaper		
Mill	4	30
Lathe	10	30
Grinder		
Drill	1	
Bench	5	
Welding		
Total	21 hrs.	

Machinist ..... *John Smith* .....

DAILY TIME RECORD

Date	Lathe	Shaper	Drill	Grind	Weld	Mill	Bench
	Time Started and Ended						
	8:00						
January 7	11:00						
	8:00						
January 8	11:00						
			9:30			8:00	10:00
January 9			10:00			9:30	11:00
						8:00	
January 10						11:00	
	8:00						
January 11	11:00						
	9.30		9:00				8:00
January 14	11:00		9:30				9:00
							8:00
January 15							11:00

Front and reverse side of the time record for the machine shop

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

THE MERRY CHRISTMAS SEASON

HOW many times, in the past few days have we used or heard the heart-warming greeting "Merry Christmas"? How many of us have looked forward to this happy season with great joy?

When we were preparing for these festive days we just thought of pleasure, happiness, and probably some dwelt, at least for a short time, upon the religious significance of this period of the year. Few of us considered that some sorrowful occurrence might happen to one of our friends, or to a member of our families, or to someone very near and dear to us.

It is, therefore, appalling to learn that the Christmas week end in our country took a total of 515 lives. Auto fatalities, of course, lead. There were 392 traffic deaths. Falls and other miscellaneous mishaps took 60 lives, and fires are accountable for 63 deaths.

The victims, and their families and friends, surely had not foreseen these dreadful happenings. The traffic deaths exceeded the National Safety Council's estimate. The Council had estimated that 370 persons would be killed in traffic accidents during the Christmas holidays.

The deaths per day for Friday, Saturday, and Sunday amounted to 172. This is more than three times the deaths that were recorded for the Safe Driving Day, December 15, when 51 traffic deaths occurred.

That traffic death toll ought to mean something to the many high schools that do not as yet offer driver education courses. It is a sad commentary on our civilization that we spend our Christmas vacation killing people either on the highway or in the homes, and then do little or nothing about it.

If all high school students received a good course in driver education the present frightful carnage would no doubt be cut down.

Adult driver education courses should also be multiplied. Naturally, no one would expect that there would be no more traffic accidents after those courses were instituted, but it would surely help correct the conditions which produce such a horrible condition as we now have.

Probably it would be well if every high school would send for the little folder "How to Promote Safe Driving Day" which can be obtained from the AAA, 1712 G St. N.W., Washington, D. C.

THAT AGE-OLD COMPLAINT

DR. HALDON A. LEEDY, director of Armour Research Foundation of Illinois Institute of Technology, in speaking to the Chicago Chapter of Young Presidents, composed of leading young industrial executives, called attention to the fact that the United States must under no condition allow anything to halt the further mechanization of America's business and industry. To do so would allow Russia to forge ahead of us and thus get the upper hand not only over us but also over the other countries of the world.

The past has demonstrated that whenever a mechanism was invented which cut down manual labor and the time and cost of production it profited all, and in most cases affected labor favorably.

If automobiles were constructed by old-fashioned production methods, most of us would be unable to own such a conveyance. Since mass production systems have been perfected, even the laborer can and does own an auto, and thousands of mechanics are employed to produce the cars which the public is clamoring for.

If nails, screws, and bolts could not be produced on automatic machinery but had to be made by hand, the price of these articles would have to be so high that they would be beyond the reach of the ordinary consumer.

Automatic machinery has not created less jobs but more jobs. We need more of it to make our country better able to protect itself and serve its many markets. Let us hope that our engineers, inventors, and researchers produce more and more new automatic machinery and new raw materials, all of which will help to make the United States bigger, and we hope better.

SCIENCE AND FAITH

IN THE January issue of *Mechanical Engineering*, official publication of the American Society of Mechanical Engineers, Gilbert E. Doan, manager of metallurgical research, Koppers Co., Inc., Pittsburgh, Pa., and former head of the department of metallurgical engineering at Lehigh University, pointed out that science, after drastic re-examination of its tenets of the past century, admits that it is far from being the possessor of and ultimate source of verifiable truth.

He quotes Lord Bertrand Russell, a leading scientist and philosopher, as stating:

"It is a curious fact that just when the man in the street has begun to believe thoroughly in science, the man in the laboratory has begun to lose his faith.

"When I was young, most physicists entertained not the slightest doubt that the laws of physics give us real information about the motion of bodies, and that the physical world does really consist of the sort of entities that appear in the physicist's equation. Nowadays matters are quite different. The revolutionary ideas of the philosophy of physics have come from the physicists themselves, and are the outcome of careful experiments. The new philosophy of physics is humble and stammering where the old philosophy was proud and dictatorial."

Science has discovered that the firmly held faith in such laws as Newton's principles of time and space were not as basic and immutable as they had once been held to be. In the same way the ideas about the constancy of energy have been changed since the atom bomb was exploded.

Further developments may change more of our ideas about the "truths" of science.

It is certainly good that colleges are beginning to integrate science with religion, because science can contribute richly to truth without discrediting the areas of faith.

ATTENTION, PLEASE!

DUE to the increase in postal rates and the rising cost of production, it has become necessary to increase our subscription rates to INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. Effective April 1, 1955, the rates will be one year, $3.50; two years, $5.50; three years, $7.50.

Current subscriptions will not be effected by this change till expiration. New and renewal subscriptions will be accepted at the old rate until April 1, 1955.

Problems and Projects

SMOKING STAND

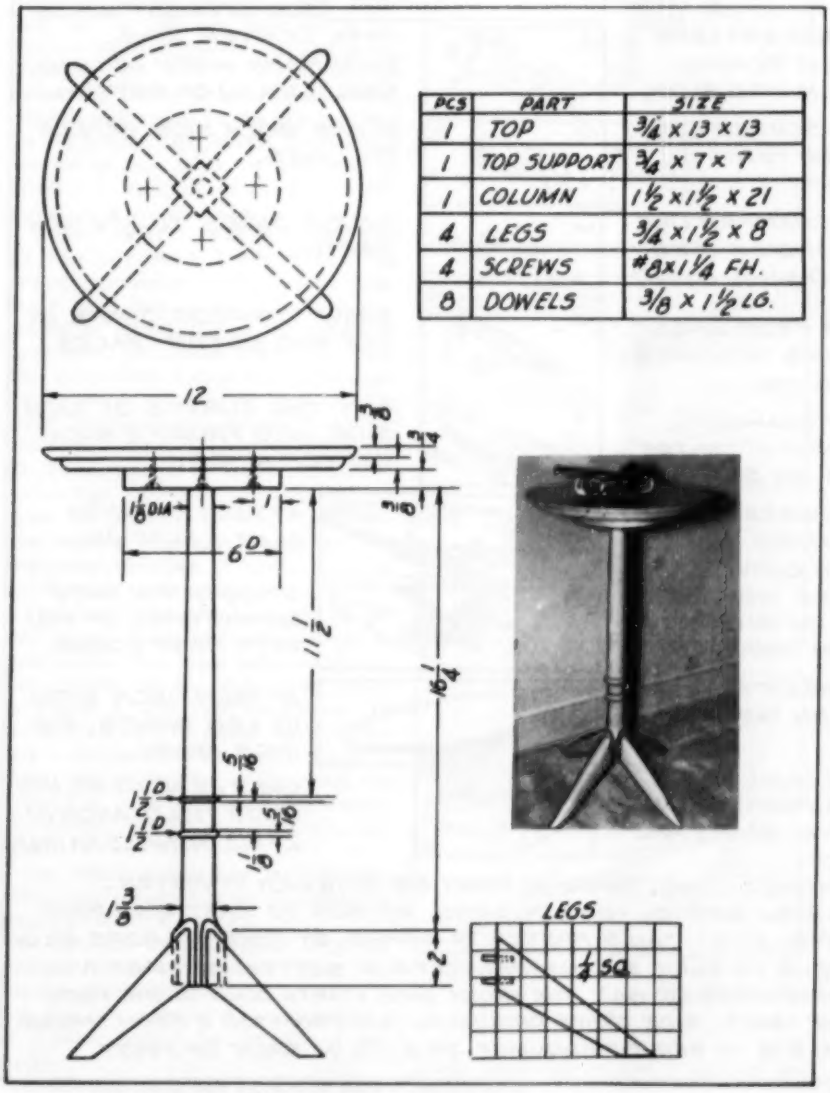
EDWARD B. RAY
Industrial Arts Instructor
Division Avenue Junior High School
Levittown, N. Y.

The smoking stand described here is made of oak. It can be used in both the modern and traditional homes. The top can be varied in style, such as inlay, overlay, or undercutting (saucer shape). It can be constructed in any woodworking class.

The finish is simple. Natural wood filler, diluted with turps if necessary, to a creamy consistency. Wipe off excess. Allow to dry for at least 24 hours. Sand down surfaces with fine (3/0) abrasive paper followed with very fine (6/0) abrasive paper.

Apply one coat of half-and-half shellac. When thoroughly dry, steel wool the surface lightly. Apply two coats of lacquer or Satinlac,* rubbing each coat with very fine steel wool after drying. Next apply two or three coats of paste wax.

*Satinlac is manufactured by the United States Plywood Corporation.


PCS | PART | SIZE
1 | TOP | 3/4 x 13 x 13
1 | TOP SUPPORT | 3/4 x 7 x 7
1 | COLUMN | 1 1/2 x 1 1/2 x 21
4 | LEGS | 3/4 x 1 1/2 x 8
4 | SCREWS | #8 x 1 1/4 FH.
8 | DOWELS | 3/8 x 1 1/2 LG.
12
6 0
16 1/4
LEGS

The details, list of materials, and the finished smoking stand by Edward B. Ray

POLYESTER COLD-SETTING PLASTICS IN THE SCHOOL SHOP

ALEXANDER F. BICK
Milwaukee, Wis.

(Continued from page 18 of the January, 1955, issue)

The importance of polyester plastics may be gauged by the fact that the largest structures in industry are made, using them as the binding material in glass fiber laminations. Theoretically, there is no size limit to polyester castings. The reason for this is to be found in the method and in the phenomenal strength of their relatively light, thin-walled structures. These are actually as strong, and in some applications, stronger than steel, weight for weight. Fifty-foot milk truck tanks, immense radar housings, airplane, cruiser, and car bodies, and entire one-piece house roofs are a few of the present applications. There are, of course, a host of smaller uses, but in this article we are dealing with one of the larger applications of interest to schools. It is becoming more urgent yearly that schools make place for this most typical of plastics.

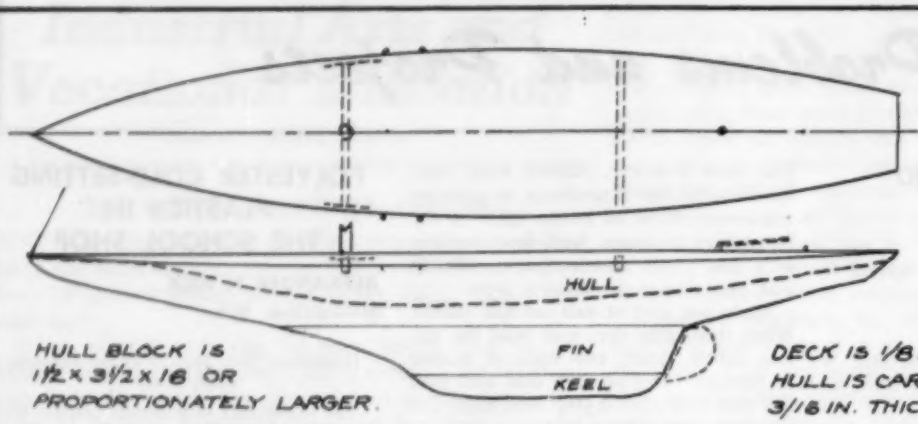
From another standpoint, the industrial importance of this polyester may be gauged somewhat from the fact that while in the beginning of its development a few years ago, one, and then four companies manufactured and promoted it, now over forty firms, among them the largest chemical firms in the country and abroad make and assist small businesses in applying it to its many uses. The schools will do well to follow this trend, for, from the viewpoint of the school, not alone does it represent an important product of industry, but it offers experiences in the typically new approaches to old problems, and it teaches the representative chemical nature of plastics, showing students firsthand the reaction of a polymer to a catalytic additive. Then, too, the process of laminating and forming and the problems of molds and releases are contacted as matters of course.

It is perhaps a step toward that which is advocated in these articles when a school heats and bends commercial plastic sheet, presses it and models it, but frankly, such work is but a small fraction of the plastic story and hardly typical, alone.

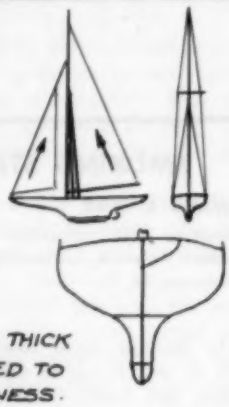
How simple is working with polyester plastics in schools?

1. The methods involve no new equipment other than woodworking tools and a sink.

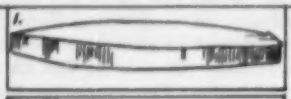
2. The process of pouring plastic and



HULL BLOCK IS 1½ x 3½ x 16 OR PROPORTIONATELY LARGER.

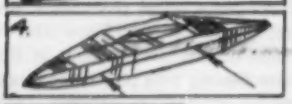


DECK IS 1/8 IN. THICK HULL IS CARVED TO 3/16 IN. THICKNESS.

1. 
CUT PLAN VIEW STRAIGHT DOWN.

2.
CUT SIDE PATTERN STRAIGHT ACROSS. ATTACH VISE BLOCK

3.
MARK CENTER LINE & FIN PATTERN ON BOTTOM.

4. 
DRAW CHAMFER LINE ON EACH SIDE. (SEE DOTTED LINE ABOVE)

5.

CUT V BOTTOM FROM LINES 3 TO 4, CUTTING TO CENTER LINE & AROUND FIN.

6.
DRAW AND CUT CHAMFER MEASURING 1/4 INCH AT CENTER FROM ARRIS 'a' ON 5.

7.
ROUND BOTH ARRISES IN 6 WORKING ALL AREAS INTO SMOOTH CURVES.

8.
REVERSE VISE BLOCK & HOLLOW OUT HULL GOUGING TOWARD CENTER

9.
CUT SHEER 3/16 INCH DOWN ON GUNWALE

10.
NOTCH HULL FOR 2 BEAMS POSITIONED AS ABOVE. BEAMS ARC 3/16 INCH.

11.
MAKE FIN. FROM A 1½ x 1½ x 8 BLOCK, CUT SIDE STRAIGHT ACROSS

12.
MARK CENTER LINE. THEN MARK WIDTH OF LEAD KEEL (3/8 IN.) ON BOTTOM.

13.
PLANE BOTH SIDE BEVELS TO LINES.

14.
GOUGE SIDES TO 3/16 INCH DEPTH.

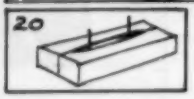
15.
DRAW TORPEDO SHAPE ON TOP AND BOTTOM FACES.

16.
CUT THE CURVES OF EACH SIDE INTO FRONT & BACK CENTER LINES.

17.
ATTACH FIN WITH GLUE & SCREWS.

18.
SMOOTH FIN INTO CURVATURES OF HULL WITH RASP & SAND.

19.
ATTACH DECK WITH 1/2 x 20 BRADS, 3/4 INCH APART.

20 
CAST LEAD KEEL INTO WOOD MOLD AROUND 2 - 1½ IN. NAILS FOR HOLES

21. MAKE MAST, 21 INCHES LONG, TAPERING FROM 3/8 TO 1/8 INCH DIAMETER.

22. MAKE BOOM, 3/16 INCH ROUND, 10½ IN. LONG. ATTACH TO MAST 5/8 ABOVE DECK WITH WIRE EYELETS. SAILS FASTEN TO SPARS BY THREAD LOOPS 3/4 IN. APART. MAST IS HELD TO DECK BY SHARPENED PIN IN BOTTOM OF MAST AND BY FRONT & SIDE STAY WIRES (30 GA). THE FRONT WIRE STARTS DOWN TO THE PROW 16 INCHES UP ON THE MAST. SIDE STAYS ORIGINATE ½ IN. FROM TOP & FROM SPREADER (3 IN. UP) TO EYELETS IN SIDE OF GUNWALE 3/4 & 1½ IN. BACK OF MAST.

Fig. 1. 16-in. model boat.

adding its hardener is no more complicated than adding cream to coffee, and laminating procedures are as understandable, but they must be seen and experienced if their uses and scope are to be comprehended.

How can plastics, as a subject, be wedged into an already fixed curriculum?

1. Polyester resin projects fit best into augmented wood or metal programs, as recommended in previous articles. Combination courses such as plastics in the woodworking course, or plastics in the metalwork course, are superior to straight plastics or straight woodworking courses, partly because of the broader views possible by comparisons, and partly because the trend requires such views.

2. This plan opens the way for shops to teach plastics now, without changing or disarranging existing programs. In other words, courses may remain the *Woodworking Course*, or the *Metalworking Course*, as the case may be; and new materials, in this instance polyester cold-setting plastics and Fiberglas cloth, may be brought into the procedures merely to enrich these courses out of consideration for the new products. As new programs are planned, woodworking courses as such might be designated as *Wood and Materials*, or *Design and Materials*, or *Wood and New Materials*.

Today's subject: *Small Boats and How to Make Large Boats New* is typical of the latitude permissible with polyesters. Making a small boat of plastic may be considered an introduction to the making of large boats. The process is identical. There has always been a deep interest in boats among men of all ages. We know of adult night classes consisting entirely of amateur fishermen building 12- and 16-foot boats. On the other hand, we hear of numbers of junior high schools in the lakes and sea areas that specialize in small model sailboat building; and more would, had they the proper directions. A boat is a living, moving thing to the masculine gender.

Model sailboats may be made by the most advanced industrial processes right in your school shop, using polyester plastic. Let us start with the 16-in. model shown in Figure 1. The first requirement, of course, is a wood or plaster model. Make this to the specifications given in Figure 1, using soft white pine or basswood, or model it in plaster over a screen armature. The finished model is shellacked to a high gloss.

The following directions are all numbered. Each paragraph refers to a similarly numbered sketch in Figure 2.

1. Cover the shellacked model with two coats of Castoglas release and two of car wax. See 1 in Figure 2.

2. Cut four pieces of Fiberglas cloth to fit a paper pattern for the side of the model.

3. Assemble the needed supplies on clean newspaper. The Castoglas resin, hardener, eyedropper, paper cup, stirring stick, clean brush, brush cleaner, and a block to set the model on.

4. Pour 3 ounces of Castoglas into the paper measuring cup.

5. Add a rounded ¼ teaspoonful of hardener and mix.

6. Brush the mixed plastic over the first side of the model. Add the first piece of

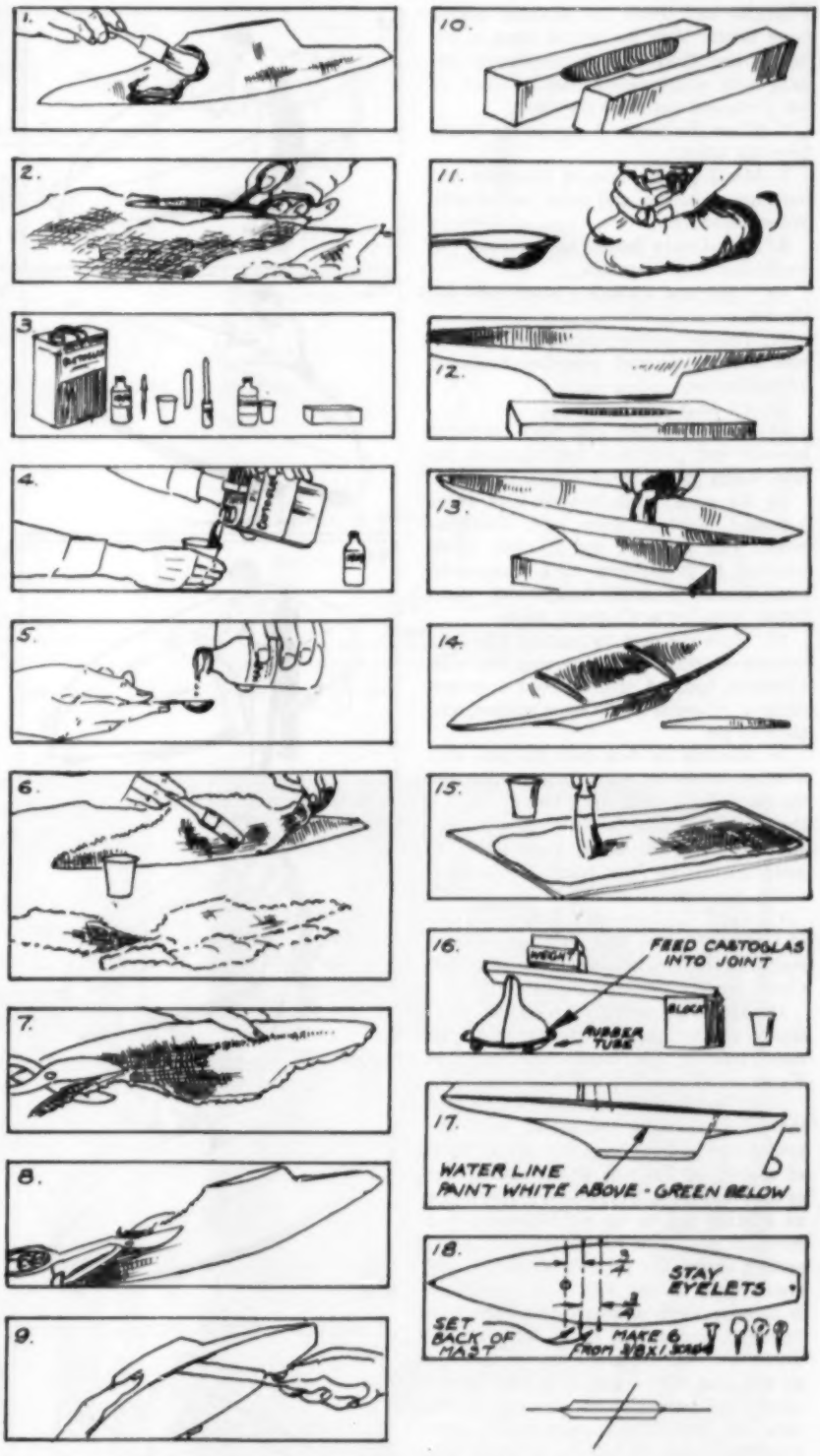


Fig. 2. Making a model boat

Fiberglas and brush out smooth, adding more plastic. Add the second piece of Fiberglas and brush smooth, uniformly covering with plastic. Place boat on block to gel. Press out and clean the brush.

7. When the plastic is dry to the touch, trim the edges.

8. Mix 3 more ounces of Castoglas and hardener as before, and cover second side. When gelled, trim.

9. Immediately loosen and remove the lamination with a spatula.

10. Carve and shellack a wood mold for the keel.

11. Powder lead by pouring molten metal into heavy cloth and pounding it during crystallization.

12. Fit boat into keel mold.

13. Mix powdered lead into Castoglas mixture and pour into keel through the hull. When gelled, remove mold.

14. Fit wood beams into the boat where indicated. Cement them with Castoglas mixed with hardener and Castosil (glass powder) in proportions of 1 teaspoonful — 6 drops — 1 small teaspoonful, mentioned hereafter as Castoglas paste.

15. Make the deck by coating Castoglas mixture on sheet glass, covering this with Fiberglas, brushed smooth. Add a second piece of Fiberglas in the same manner, and allow to gel.

16. Remove the deck from the glass with a chisel and mount over rubber tubing. Set the boat, and weight down heavily so that the rubber presses the deck close to the gunwale along the sheer. Feed Castoglas paste freely into the joint. When thoroughly set, trim.

17. Paint the boat with 1 tablespoonful of Castoglas mixed with 20 drops of hardener to which Castoglas color is added. Cover, sand smooth, and recoat.

18. Make 6 eyelets of annealed brass screws and set them as shown. Make the mast and rig the boat. See sketch in Figure 1.

If all that is given above were amplified, the result would be a full-sized boat. The model on which the large hull is cast must, of course, be full size, and to supply one of that dimension would be simplified were an existing hull to serve temporarily as a mold. If such a hull were found to be in perfect shape, the problem would be still more simple, but as with most boats, here is a tear, there a gouge, the bottom is furrowed, and a spot shows signs of rot. Therefore, our concern today is to make an old boat new — and it is new, permanently leak proofed with a tough, resilient skin of glass cloth impregnated with Castoglas resin. It will be a better boat than it was when built or bought, and best of all, there will be no more calking, painting, or refinishing.

The general procedure to follow is this:

First, send for direction booklet and supplies (Castolite Company, Marine Division, Woodstock, Ill.).

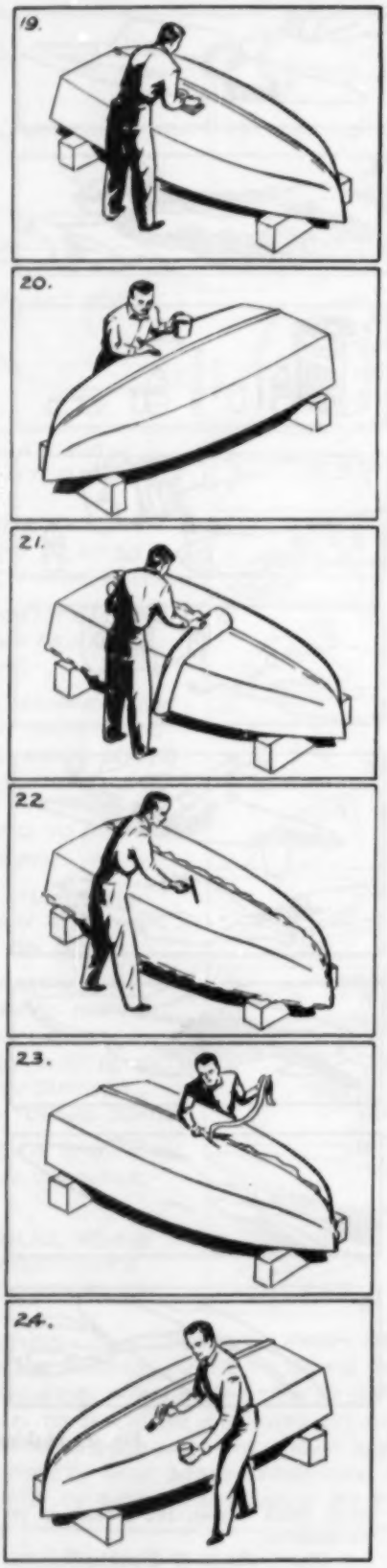


Fig. 3. Making an old boat new.

The following paragraphs refer to sketches in Figure 3.

19. Prepare the hull surface. Sand down to new wood. Fill holes and unevenness with Castoglas paste.

20. Mix Castoglas and hardener to cover one side of hull and coat.

21. Apply Fiberglas cloth over the first coat of Castoglas and squeegee smooth.

22. Mix a second batch of Castoglas and hardener and brush over the cloth. Color may be added to this coat if desired. Apply evenly.

23. Trim off excess cloth and sand rough edges and laps. Then repeat steps 20, 21, 22, and 23, on the second side of the hull.

24. A last coat of colored Castoglas may be added over the entire hull.

The same procedure may be used to repair water and acid tanks, waste pipes, trailer roofs, cement steps, birdbaths, sprinkling cans, handles, and a host of other things. Thus, you will appreciate the almost endless scope of polyester plastics. Its flexibility is valuable to industry, in constant search for new approaches and economies.

THE DEMONSTRATION MIRROR

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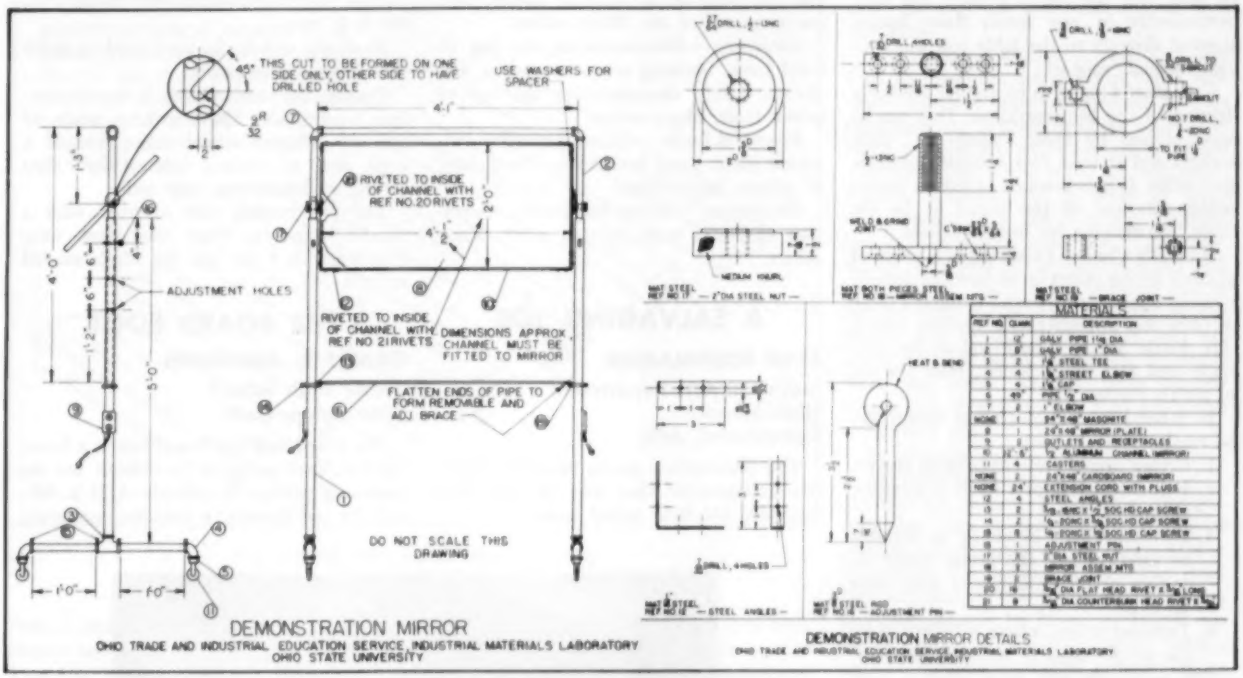
Consultant, Instructional Materials
Ohio Trade & Industrial Education Service
Department of Education
Columbus, Ohio

Experimentation proves a point! This was the case during this last school year when the instructional materials laboratory of the Ohio Trade and Industrial Education Service experimented with a demonstration mirror. The following conclusions are the outcome of this trial situation as carried on by Ralph Neal, machine trades instructor at Lancaster High School, Lancaster, Ohio.

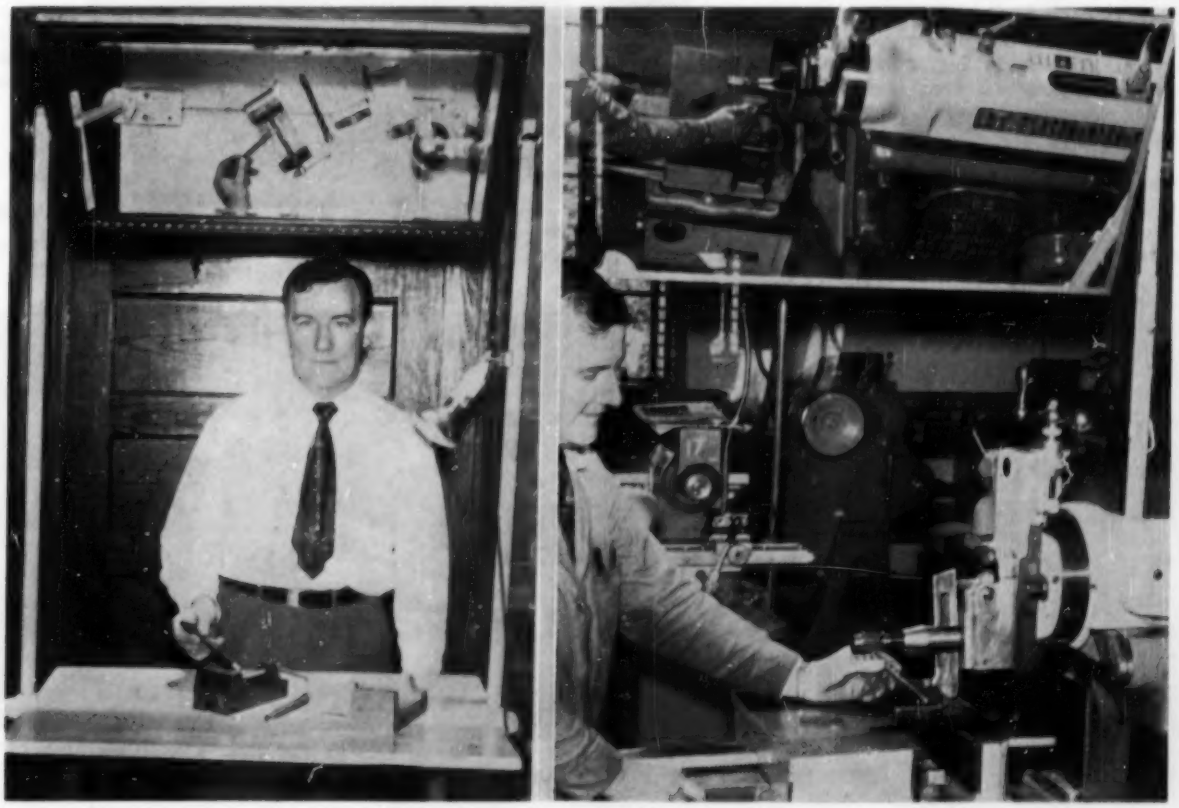
What It Is — The demonstration mirror is an aid designed to facilitate better and more effective demonstrations. Under the best conditions demonstrations to a sizable group (average class size) produce questionable results. It is, therefore, important that every effort be made to increase their effectiveness by using aids which will enable groups to view such demonstrations better, and to observe them in detail.

How It's Made — The actual construction of the mirror can vary in many respects. The most essential element is, however, the mirror itself. The mirror should be at least 2 ft. by 4 ft. in size and of a good quality plate glass. Such a mirror will assure a clear image without distortion.

The stand should have adjustments for the height and angle of the mirror. If the mirror is to be used in a number of different situations, provision should be made to move it by placing large size coasters under the stand. If, however, it is only going to


THIS CUT TO BE FORMED ON ONE SIDE ONLY, OTHER SIDE TO HAVE DRILLED HOLE
USE WASHERS FOR SPACER
RIVETED TO INSIDE OF CHANNEL WITH REF NO. 20 RIVETS
ADJUSTMENT HOLES
RIVETED TO INSIDE OF CHANNEL WITH REF NO. 21 RIVETS
DIMENSIONS APPROX. CHANNEL MUST BE FITTED TO MIRROR
FLATTEN ENDS OF PIPE TO FORM REMOVABLE ADJ. BRACE
DO NOT SCALE THIS DRAWING
DEMONSTRATION MIRROR
OHIO TRADE AND INDUSTRIAL EDUCATION SERVICE, INDUSTRIAL MATERIALS LABORATORY
OHIO STATE UNIVERSITY
MATERIALS
DEMONSTRATION MIRROR DETAILS

Details of the demonstration mirror



An early model used in related classes. At right, using the mirror with the shaper

be used over the top of a table and kept permanently in one room, floor flanges screwed directly to the table top will provide adequate support.

Care should be taken to provide adequate lighting of the demonstration. This can be accomplished by using "clamp on" light sockets and at least two 150-watt flood or spot bulbs. It is convenient to have a duplex outlet attached to the stand or to the table. See drawing for further details.

How It's Used — Following is a series of pictures giving examples of how the demonstration mirror can be used. Although these pictures deal primarily with machine trades, this should not be interpreted as the only trade area that would benefit from the use of such a mirror.

In general the demonstration mirror can be used effectively for:

1. Giving demonstrations to large groups.
2. Demonstrations of a small or intricate nature.
3. Demonstrations involving an element of safety where the group might interfere or be in danger if they were up close.
4. Demonstrations where visibility from the proper angle is highly important.

The instructor will learn after a little experimentation that he can make a demonstration from several different angles. He may face into the mirror when it is important to show right and left hand positions in the proper relation. The fact that one's back is to the class may present a problem. However, by looking into the mirror, the group can be observed as readily as if they were in front of the instructor.

Demonstrations may also be presented while the instructor is standing with his back or side to the mirror. These positions show excellent views, but have the disadvantage of reversing right and left positions. This is no problem when these positions are not relative to the demonstration itself. Of course, lettering or writing will always appear reversed unless it is reversed before placing it under the mirror. This can be done through a little practice or by placing a sheet of carbon paper face up under a piece of paper. The carbon impression on the underside of the paper will then be in proper reverse order.

Suggested Uses — Following is a sampling of situations in which the demonstration mirror can be used effectively:

Machine Trades — Showing setups on the various machines. Demonstrating the use of hand tools. Showing intricate assembly parts. Viewing machining operations at different angles. Showing spark identification for hardness testing. Many others.

Plumbing — Joint wiping. Welding techniques. Using hand tools. Piping layouts. Many others.

Auto Mechanics — Using hand tools. Demonstration of various equipment. Technique of brazing and welding. Showing the underside of a car on a lift. Demonstrating the workings of a cutaway motor, fuel pump, generator, etc. Many others.

Carpentry — Demonstrating the use of hand tools. Showing setups on power machines. Safely demonstrating the use of power tools. Many others.

Electrical Trade — Showing small and intricate parts. Using hand tools. The making of splices. Many others.

Bricklaying — Using hand tools. Operation of power tools (mason saw). Many others.

A SALVAGING JOB

STAN SCHIRMACHER
Industrial Arts Department
High School
Cottonwood, Ariz.

The illustrations shown herewith depict two examples of what may be done with discarded old-style school desks.

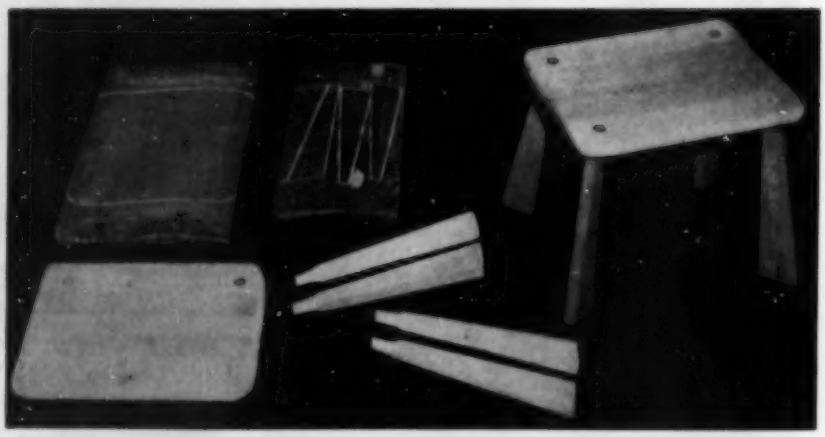
First, four workbenches were made from the desk tops.

Next, the seat backs were used to make wheelbarrow lawn chairs.

Finally, the stools shown in the illustration were made. These articles made of the old salvaged school desks aroused a great deal of student interest and they served their purposes very well.

The old varnish was removed with a varnish remover. Then the edges were rounded with a file and the whole sanded smooth.

Large shop bench. Top is three layers of old school desk tops. Base: revamped metal lockers



Maple footstool cut from seat board, as shown by chalk marks. Patterns on bottom to miss "slots." Upper center: Four legs cut from smaller seat board — and ones otherwise split. Lower left: Old varnish removed with paint remover. Edges filed round and sanded. Holes bored with auger bit, using jig to hold to same angle. Lower center: Old varnish removed. Sanded. Upper ends turned on lathe to fit holes. Right: Legs glued in holes. Filled. Shellacked. Varnished. Designed and made by 7th and 8th grade shop boys

THE BOARD FOOT

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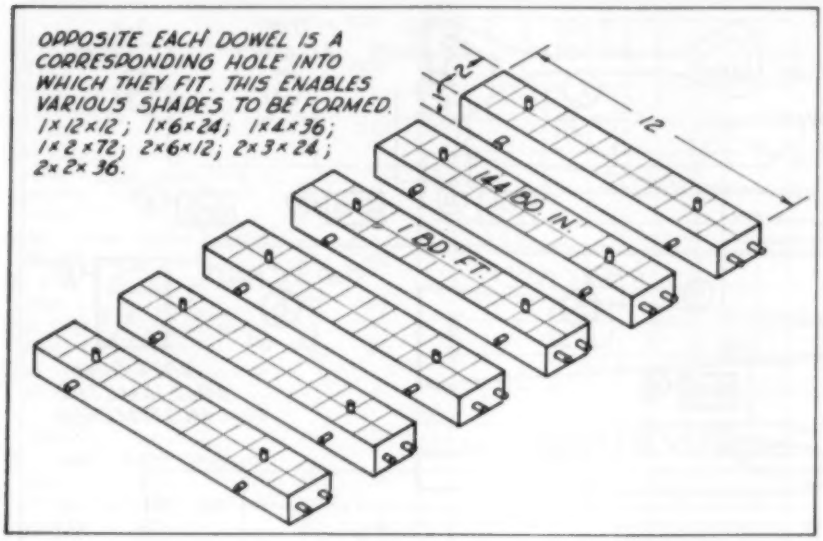
Junior High School
Wilmington, Calif.

The board inch and board foot is a learning unit that seems to be difficult for the beginning student to understand. It is difficult for the student to visualize one board


OPPOSITE EACH DOWEL IS A CORRESPONDING HOLE INTO WHICH THEY FIT. THIS ENABLES VARIOUS SHAPES TO BE FORMED.
1×12×12; 1×6×24; 1×4×36; 1×2×72; 2×6×12; 2×3×24; 2×2×36.
2
12
144 BD. IN.
1 BD. FT.

The board foot as a teaching aid

foot of lumber as being in so many different shapes and sizes, i.e., 1 by 2 in. by 6 ft., 1 by 4 in. by 3 ft., 1 by 6 in. by 2 ft., 2 by 6 in. by 1 ft., 3 by 4 in. by 1 ft., etc.

The teaching aid shown here has been a tremendous help in overcoming this difficulty. By inserting the doweled sides of the wood into the corresponding holes, many different sizes and shapes of lumber can be formed, with each piece still containing the original 144 board inches.

ELECTRICAL TEST PANEL

THOMAS R. GAINES
Associate Professor of Industrial Arts
on leave from Central Missouri
State College
Warrensburg, Mo.

The electrical test panel and workbench shown herewith, is used as a test panel and part of the work area for general shop electricity and a unit course of applied electricity in the industrial-arts department at Central Missouri State College, Warrensburg, Mo.

This test panel can be constructed and assembled at a cost of approximately $110, less the watt-hour meter and bench.

The panel is mounted on the back of a maple top bench. The drawers serve as convenient storage space for electrical supplies. For protection and insulation, a sheet of 1/16-in. asbestos hard board has been used to cover the top of the bench.

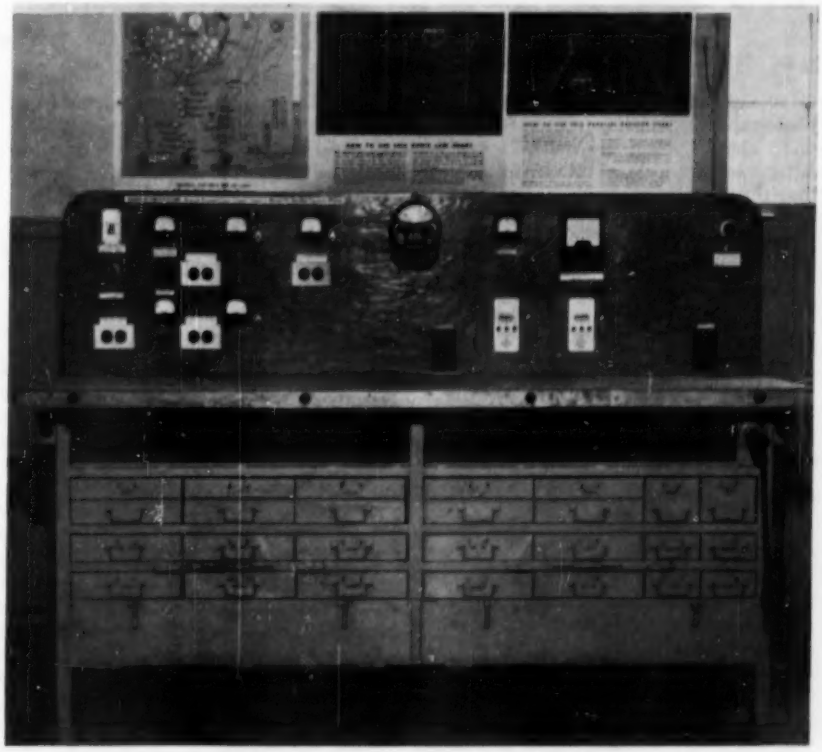
As the schematic drawing indicates, the 115-volt line enters a watt-hour meter which registers all of the load used on the bench. A twenty ampere multibreaker master switch protects the a.c. testing circuits and the continuity test light circuit as well.

The 0-150 a.c. voltmeter shown located in the upper left corner of the photograph is wired in parallel with duplex receptacles (a), (b), and (c), as shown on the schematic diagram. These appear as ivory plates in the photograph. A special phone jack is used on one terminal of the voltmeter, see the schematic diagram, as a safety device which breaks the 115-volt circuit when the meter is used for individual testing with test leads.

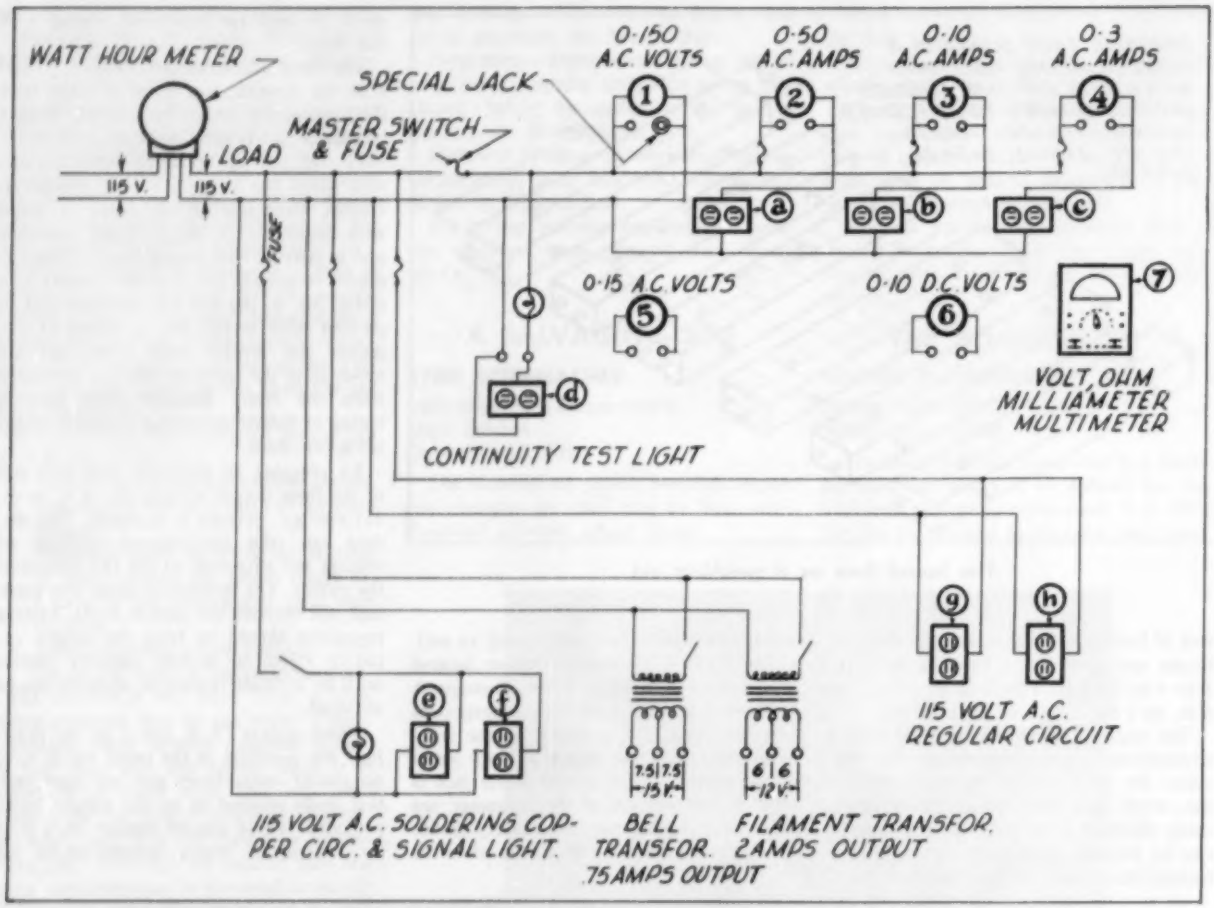
The three a.c. ammeters, Nos. 2, 3, and 4 on the diagram, are wired in series with their respective duplex receptacles. Duplex receptacle (a) is wired in series with meter No. 2, the 0-50 a.c. ammeter, and in parallel with meter No. 1, the 0-150 a.c. voltmeter. Duplex receptacle (b) is wired in series with meter No. 3, the 0-10 a.c. ammeter and in parallel with meter No. 1. Likewise, duplex receptacle (c) is wired in series with meter No. 4, the 0-3 a.c. ammeter and in parallel with meter No. 1. Fuses of the proper size protect each meter and are mounted in the panel so they are accessible from the front. Regular jacks provide means of individual testing with any meter using test leads.

By plugging an electrical load into any of the three duplex receptacles (a, b, or c), 115-volt a.c. current is available. The student can take simultaneous readings of voltage and amperage on the two meters in the circuit. The product of these two readings will describe the load in watts. Testing procedure should be from the largest capacity meter to smaller capacity meters until an accurate reading in amperes can be obtained.

Three meters (5, 6, and 7 on the drawing) are mounted in the panel which have no circuit connections and are used with test leads plugged in to the regular jacks provided. These meters consist of a 0-15 a.c. voltmeter, shown located under the



Electrical test panel and workbench



Schematic diagram of the electrical test panel

0-150 a.c. voltmeter on the left side of the photograph, a 0-10 d.c. voltmeter, and a volt, ohm, milliameter multimeter, the latter two of which are shown located to the right of the watt-hour meter.

The continuity test light appearing on the extreme left of the photograph is wired in series with duplex receptacle (d), shown in the photograph as an ivory plate directly below the light. Regular jacks for use with test leads are also provided.

There are two duplex receptacles, (e) and (f), mounted, one at each end of the bench, in surface type metal outlet boxes for use with electric soldering coppers. A panel indicator light is wired in parallel with them and the circuit is controlled by a switch below the light appearing on the extreme right of the photograph. This circuit is fused on the back side of the panel.

A convenient and economical power supply is provided, by the two transformers appearing on the right lower side of the photograph, for low voltage circuit wiring and testing projects such as toy electric motors, arcing pencils, etc. Each transformer is controlled by a separate switch on the panel to the right of the jacks and transformer symbols. Both transformers are protected by a fuse mounted on the back of the panel.

Regular 115-volt a.c. current is available from the two vertically mounted, brown plate, duplex receptacles, (g) and (h), shown on the lower right side of the photograph. This circuit is also fused on the back side of the panel.

It may be noted that there is additional space on the left and right sides of the panel for further development and the addition of testing equipment for radio or television work.

Following is the list of electrical materials and instruments used in the construction of the panel. These materials are available at any regular radio and television supply house, or school supply sources such as:

Allied Radio Corporation, 833 West Jackson Boulevard, Chicago 7, Ill.
Brodhead Garrett Company, Cleveland 5, Ohio.
Burnstein Applebee Company, 1012 McGee Street, Kansas City, Mo.
Eagle Electronics, Inc., Irvington, N. Y.
Universal Scientific Company, Vincennes, Ind.

These named are only representative of sources and in no sense comprise a complete listing.

MATERIALS LIST

	Unit Price	*Cost*
One 115 volt watt-hour meter (to be secured from local electrical power company).....	....	....
One 0-150 a.c. voltmeter, 3 by 3 in. square, flush panel,* triplet meter, model No. 337 S..	$ 9.50	$ 9.50
One 0-50 a.c. ammeter, 3 by 3 in. square, flush panel, triplet meter, model No. 337 S...	8.50	8.50
One 0-10 a.c. ammeter, 3 by 3 in. square, flush panel, triplet meter, model No. 337 S...	8.50	8.50
One 0-3 a.c. ammeter 3 by 3 in. square, flush panel, triplet meter, model No. 337 S...	8.50	8.50
One 0-15 a.c. voltmeter, 3 by 3 in. square, flush panel, triplet meter, model No. 337 S...	8.50	8.50
One 0-10 d.c. voltmeter, 3 by 3 in. square, flush panel, triplet meter, model No. 327 T...	10.90	10.90
One volt, ohm, milliameter, 5¼ by 6¾ in. by 2⅞ in.** Electronic Measurement Corpora-		

*All meters uniform size and flush mountings.
**Face mounted on panel and box behind panel using long screws.

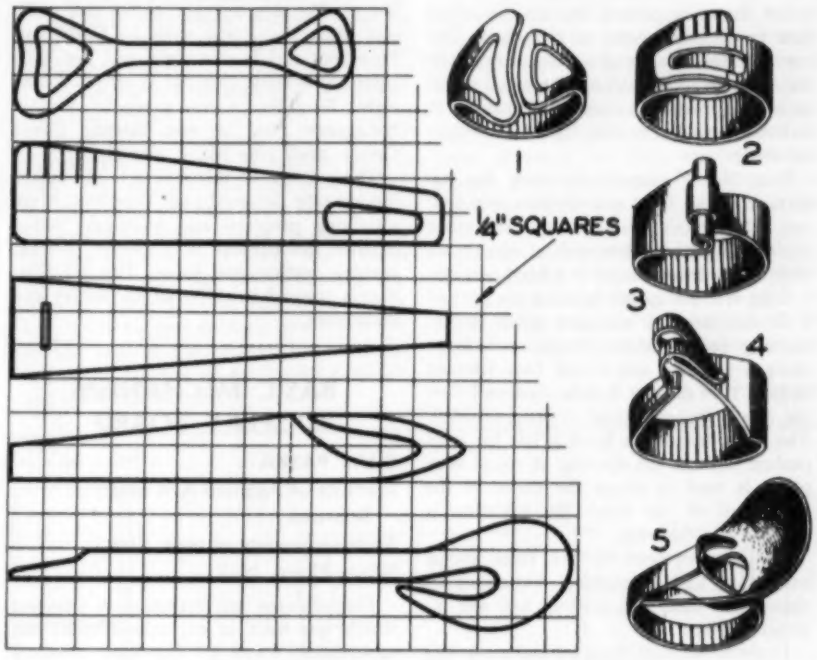
	Unit Price	Cost
tion multimeter model No. 103 or No. 104	26.41	26.41
One Bell transformer, 15 volt 7.5 volts center tap, .75 amperes output***	2.00	2.00
One filament transformer, 12 volts, 6 volts center tap, 2 amperes output (stancor No. P-8130)***	2.80	2.80
Eight brown duplex, double wipe, T-slot receptacles	.45	3.60
Six 3 by 2 by 2½ in. switch boxes	.30	1.80
Two 3 by 2 by 2½ in. switch boxes, surface type	.30	.60
Four ivory, double receptacle plates	.10	.40
Two brown, double receptacle plates	.10	.20
Two metal double receptacle plates	.12	.24
Two porcelain sign light receptacles	.40	.80
One 20 ampere multibreaker type master switch	1.40	1.40
Three S.P.S.T. toggle switches with wire leads, rating-3 amps. 250 volts; 5/16-in. shank with knurled nuts and off-on plate	.45	1.35
One mallory junior two circuit phone jack	.45	.45
Ten insulated red headed jacks, mounts in ¼-in. hole on panels up to ⅜ in. thick	.11	1.10
Ten insulated, black headed jacks, mounts in ¼-in. hole on panel up to ⅜ in. thick	.11	1.10
Three littlefuse fuse extractor parts, finger knob, to take 3AG fuse, factory No. 342001	.30	.90
Three porcelain surface light sockets to take plug fuses	.40	1.20
15 ft. No. 12 single black plastic covered copper wire	.03	.45
15 ft. No. 12 single white plastic covered copper wire	.03	.45
18 ft. nonmetallic shielded two conductor cable	.09	1.62
Three sets of all purpose test leads, equipped with banana plugs, interchangeable spade, lugs, phone tips or allegator clips	1.79	5.37
		$109.44

***Mounted on the back side of the panel with only schematic symbol, regular jacks and switch on face side of panel.

ONE PIECE SILVER RINGS

JOHN KRAINIK
Teacher of Art
Waukesha High School
Waukesha, Wis.

The five one-piece rings shown were made by students as a beginning project in a jewelry class at Waukesha High School, Waukesha, Wis. Students learned the use of simple metalworking tools, experimented in design, and finished with a satisfying and useful result.



Patterns for one-piece rings

Wearing ring No. 5

Tools used to make these rings were: snips, jeweler's saw, needle files, ring mandrel, flat face mallet, polishing rouge, and buffing wheel. Hard soldering was necessary on three of the rings.

Experimenting in design is done with thin cardboard using a razor blade to cut the cardboard rather than a scissors. A satisfying design becomes the full-size pattern and is pasted directly to the silver. Eighteen-gauge silver is used to make these rings. Steps in making the rings are similar for all five: develop the design, paste to silver stock, cut or saw out shape, file, shape over mandrel with fingers and mallet, hard solder if necessary, and polish.

Ring No. 1 is a simple self-expanding band involving no soldering. The design problem is one of space division of cutout and solid spaces. Several smaller open spaces could be cut out on one side to balance a larger open space on the other side. One side could cut more deeply into the other than it does in the suggested ring shown.

Ring No. 2 simply overlaps the band. Cutout and solid spaces are again the design problem. Lines are stamped into the silver with a small chisel before shaping. This ring was soldered but could be left unsoldered if carefully shaped on the mandrel.

Ring No. 3 suggests one end of the band penetrating the other, and then reversing at the place of penetration. The small curve at the wider end of the band is shaped first, and then the ring is shaped on the mandrel. The smaller end of the band

is left flat to be pushed through the sawed hole in the wider end of the band. The curve of the small end is shaped over the curve of the larger end using a small dowel or meat skewer as a mandrel. Soldering in a fixed position is the last step before polishing.

Ring No. 4 suggests flattening the top surface of the band and dividing one end, one half reversing direction and the other half joining the other end of the band. This ring is also soldered in a fixed position.

Ring No. 5 suggests twisting one part of a divided end of a band and giving the remaining part a three dimensional shape using a sandbag and round face forming mallet. This shaping is done first and then the ring is shaped around the ring mandrel. The small end of the band is left flat until pushed through the opening. A round nose pliers is used to shape the curve of the small end of the band. No soldering is necessary in this ring.

Flat development of the rings shown suggests a way of starting. Variations on these basic ideas will produce new and interesting rings.

Dorothy Schmidt designed and made ring No. 1. The development is for size eight ring. Ring No. 2 was made by Carol Van Pietersom and is size eight and one half. John Shaw made ring No. 3 and it is size eight. Ring No. 4 was made by Ronnie Neumeister and is size eleven. David Carson made ring No. 5, size eight.

The purpose of this article is to suggest individually designed and, therefore, more satisfying projects, and knowingly omits detailed descriptions of soldering, sawing, shaping, buffing, and so on. This information is covered in all books on jewelry and metalwork.

BASIC MECHANISM DISPLAY BOARD

ELIAS PASKA
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White Plains, N. Y.

The following two pictures show a project which was built in my school under my supervision. I call it "The Basic Mechanisms on Which Our Machine Age is Built."

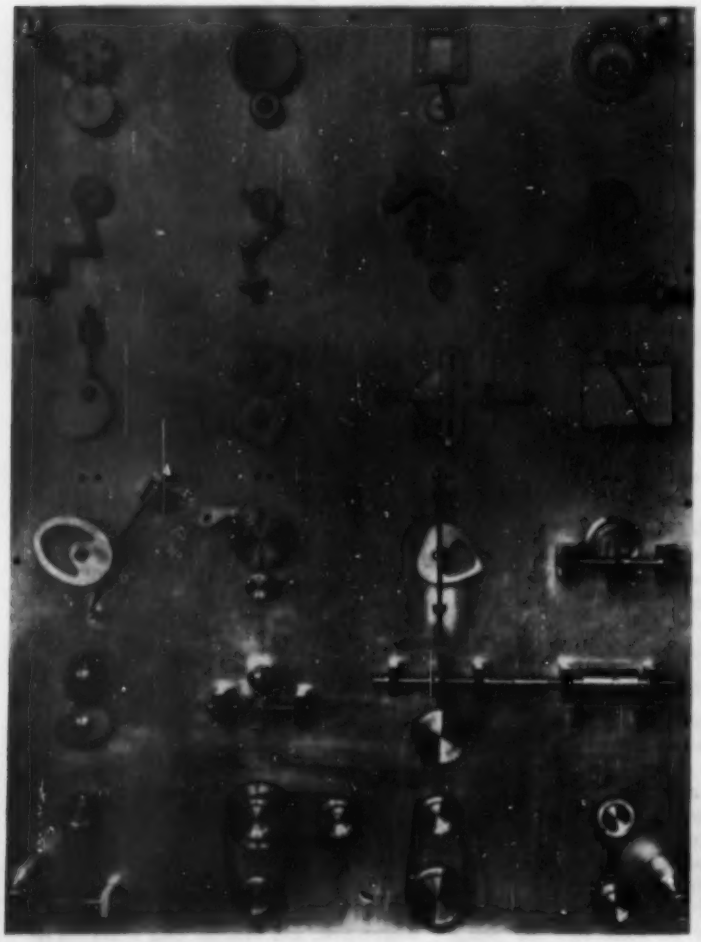
It helps my students to visualize the different types of movements which are being used today. Each movement was made by the students. We have found this geared panel to be very helpful not only in the machine shop of which I am the instructor but in related subjects like mechanics, physics, drawing, etc.

The following list shows a few applications for some of these motions.

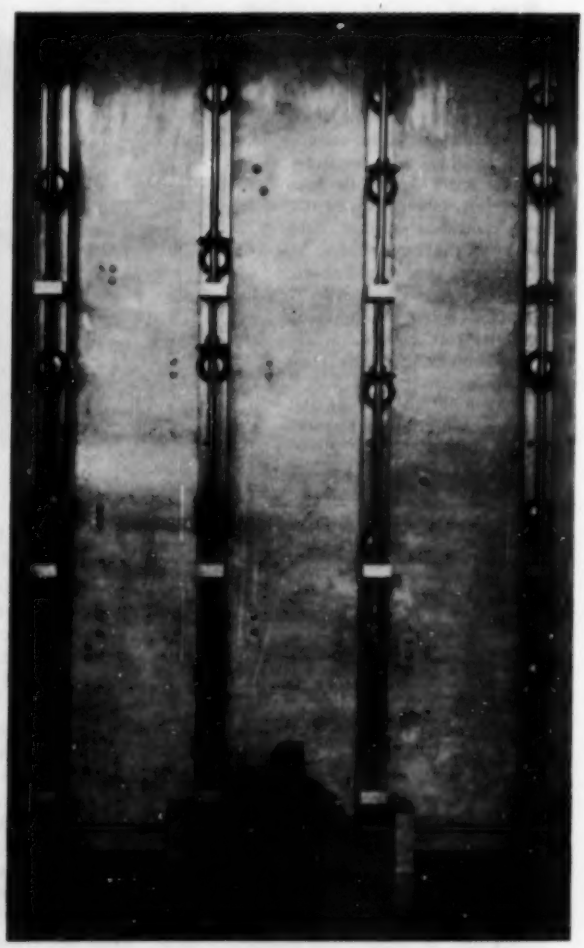
Starting at the left end of the top row in the front view is a Geneva motion. This is a device which gives a positive but intermittent motion to the driven wheel. The next movement shows a spur gear and its pinion. An example of such gears are found on the starter of a car. The next is a piston and crank. These are used in engines. The final movement in the top row is an internal gear. This has teeth on the inside of a ring now being used in cars, machines, etc.

The second row shows a bell crank. All four of the motions shown are used in automatic machinery or items which are automatically controlled.

The other examples are a slotted bell



Front view of basic mechanism board



Rear view of basic mechanism board

crank, ratchet wheel and driver, and a reciprocation rectilinear motion.

The third row shows an edge cam, square gears, slotted scotch yoke, and a slotted cross head. These motions are used for the same purpose as those in the second row, with the exception of the square gears.

The motions in the fourth row are used for the same purposes as those in rows two and three. Shown are the edge cam, indexing drive, heart cam, and crown gear.

The fifth row shows elliptical gears, a worm gear, and spiral gear. These gears and cams are used in printing presses and for speed reduction, and transmits motion at right angles. The drum cam imparts a to-and-fro motion to a slide or lever in a plane parallel to the axis of the cam. These are to be used in automatic machines.

The sixth row shows different types of belt drives used in washing machines, cars, machinery, etc.

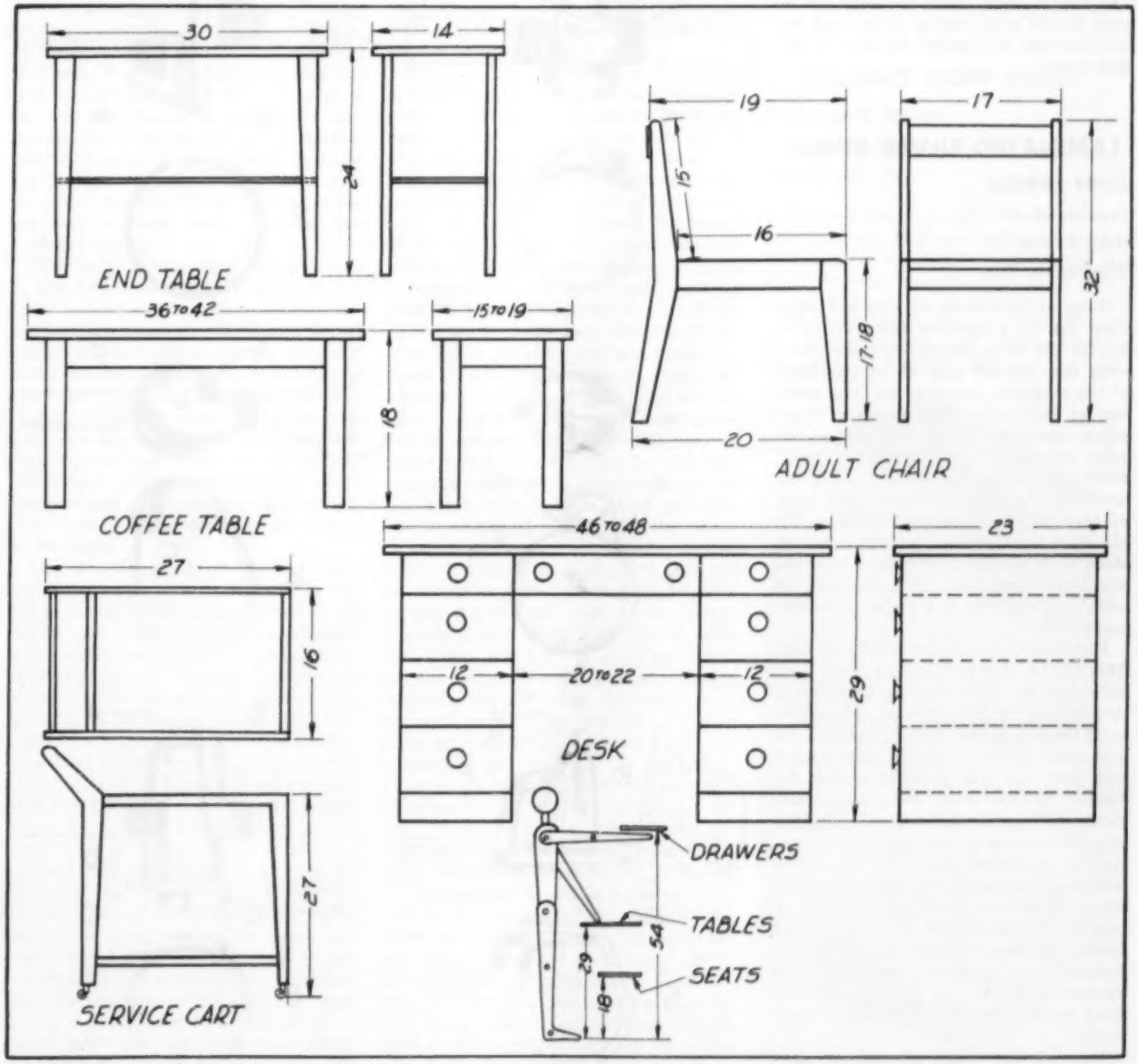
The display is 6 ft. high, 3 ft. wide, and 2 ft. 8 in. deep.

These basic mechanisms on which our machine age is built can be made in various sizes; for example, the first one I had the boys make was only 30 in. high and the motions were about 1½ in. in size, while this one has motions 4 in. in size. This is the reason that I am not mentioning any sizes of parts, because regardless of the size, it will be very valuable as a visual aid, so the size of the project may well be limited to the size of machinery available and the stock on hand.

The movements, made of solid steel, are mounted on an aluminum panel behind plastic glass. The speed of the movements is thirty revolutions per minute, which is accomplished by the use of a reduction gear box, which consists of a worm and wheel. This speed was reduced from one thousand seven hundred and fifty revolutions per minute. Bevel gears in the back are used to drive the motions, as can be seen in the picture.

Planned and supervised by me, the display is entirely student executed. The project actually cost little, for use was made of all available materials that are part of the school's annual supply of materials on hand.

The model of each motion is complete in



Basic furniture dimensions by Louis Barocci, Cudahy High School, Cudahy, Wis.

every detail and operative. The entire display is self-demonstrative by the use of a push button constructed on the side of the frame enclosure.

In the second picture, the four long vertical shafts are ⅜ in. cold rolled steel; however, for a smaller sized display one could use ¼-in. diameter steel. They are driven by means of the horizontal shaft on the bottom bevel gears. All the bevel gears and the motions seen in front were cut by students. On these vertical shafts are attached a pair of bevel gears for each motion. This means that any motion an instructor considers too difficult for his students to make can be left out. Instead of four shafts, one can have this made with only two shafts and half as many motions. The ends of these shafts are supported in steel blocks with reamed holes, and no ball bearings are needed because of the slow speed.

Laminated silver rings

LAMINATED SILVER RINGS

JOHN KRAINIK
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High School
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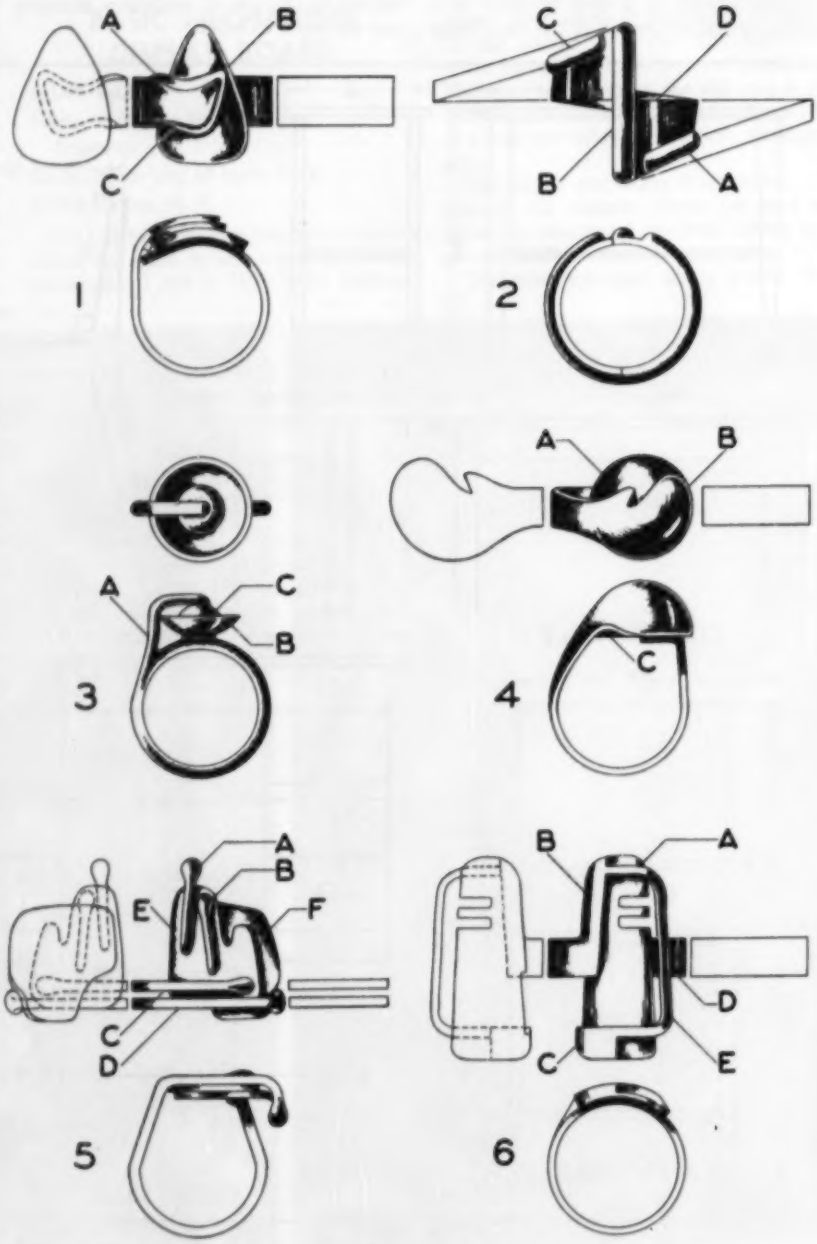
Rings of laminations of wire and sheet silver can be a desirable follow-up problem to the more simple one-piece silver rings described on page 49 of this issue of the magazine. See page 49. The problem of lamination suggests many interesting approaches to the ring and can involve experiences with new tools. Sheet silver may be laminated by building up several layers, or by superimposing a layer of wire or a layer of sheet stock, or by placing a layer of wire between layers of sheet stock. Giving sheet silver a three dimensional shape and laminating wire or additional sheet to this shape is another possibility.

Experimenting in design is the first step. This can be done by sketching ideas if an individual has some drawing background. Another approach would be to actually build the ring in thin cardboard cutting the pieces with a razor blade. The latter method will give full size patterns needed for transfer to silver stock. Some design rules should be kept in mind when planning the ring. Function of a ring must also be constantly considered. Any long protruding wires or small pieces of silver sheet will be likely to catch on clothing and should be avoided. Rings should be compact and reasonably heavy in parts that are removed from the band or shank. Incorporating the decorative top part of the ring with the band unites the two parts and is good design.

Detailed descriptions of soldering, sawing, shaping, and so on will be omitted in describing the construction of these rings



Various types of laminated rings

as this information is covered in all books on jewelry and metalwork. Full size patterns must be planned for all rings first. Wire lengths cannot always be judged and must in some cases be fitted as the work progresses. The line drawings to the left and right of the completed rings show the developed sizes of the pieces before shaping. Length of the band depends on finger size and is not indicated. Twenty, 18-, and 14-gauge silver was used on all rings. Drawings indicate thickness of particular pieces.

Ring No. 1 is the simplest kind of lamination of layers of sheet silver. The design is desirable since two of the layers have the same general shape creating unity between the parts of the ring. The third shape opposes the other two and creates an interesting contrast. The band is incorporated into the top layer to create unity between band and decoration. Construction is simple. Pieces *A* and *B* and band *C* are sawed out, filed, and the edges are finished. They are then cleaned and soldered together in a flat position. Shaping is done on a ring mandrel with the fingers and a rawhide mallet. Shaping is started with the band and the laminated pieces are brought over the top of the band. Some adjustment for size may be made before soldering the band in place.

Ring No. 2 is half round wire pieces *A*, *B*, and *C* laminated to flat shape *D*. All pieces are finished and then soldered together in a flat position. The ring is shaped around a ring mandrel working from the center out toward the edges. It is fitted to finger size and soldered together in the back. Design of this ring might be described as a uniquely shaped band with the decoration repeating the shape of the band in the half round wire. This means complete unity between band and decoration. The vertical center will become slant when the ring is on the finger.

Ring No. 3 suggests the band of half round wire rather than flat stock. It is carried to the top of the decorative part of the ring to unite band and decoration. The two domes repeat each other in reverse to create unity of parts with variation. Construction of this ring is started with the band *A*. About 3/8 in. of the end of a piece of half round wire is taper filed. This is shaped to finger size and soldered together with the end of the half round wire projecting outward from the band. The larger round shape *B* is a 1/4-in. circle dapped in one of the larger holes of a dapping block. The top and bottom of the dome are filed flat. A flat spot is also filed on the half round band to make soldering easier. The smaller inside dome *C* is fused scrap. The larger and smaller domes are soldered to the band and to each other in a single operation. Bending the projecting piece of half round to touch the top dome is followed by cutting off to correct length and soldering in place. Filing the square end of this piece of wire will finish the construction. This ring should be oxidized in the inverted dome and then polished.

Ring No. 4 again carries the band into the decoration. The design is repetition of round shapes in the third dimension. A true half sphere *A* is made from a 7/8-in. circle of silver. This is soldered to a flat sheet of silver about 3/4 in. square. It is trimmed round after soldering by cutting and filing. The free form shape *B* is sawed out and finished and then dapped in the same hole as the half sphere. *A* and *B* are then soldered together. The band is shaped and sized, working from the top to the underside. Final *L* shape on the band is made with a flat nose pliers. Band and underside of dome *C* are soldered in place. The *L* shape of the end of the band gives strength to the solder joint. The final solder joint should be near the outside of the bottom of the dome so as not to present too great a protrusion of the dome.

Ring No. 5 is different because the band is composed of two smaller bands of square wire. Ends of the square wire are fused into round balls to create unity between square wire and round shape of laminated flat pieces. Flat pieces also have straight sides to repeat the straight nature of the square wire. Construction begins with the fusing of the end of a piece of square wire and cutting off to the length of piece *A*. This is repeated and cut off to the length of piece *B*. Lengths of pieces *C* and *D* are determined by finger size. The ends of the latter pieces are also fused into balls. Flat pieces *E* and *F* are sawed to shape and finished for soldering. The unfused ends of pieces *A* and *B* are filed into a round shape and the bottom of the fused ball ends of pieces *B* and *C* are also filed flat to insure complete soldering. All pieces are soldered together in a flat position in one operation. The fused end of piece *D* and the pieces of the band project horizontally at this point. Shaping of the band starts from the flat decorative part of the ring using a pliers to grip the flat laminated pieces. Finger pressure is used to bend the square wires into shape. The band is completed on a mandrel using more finger pressure and a rawhide mallet. Turning the square wire into an *L* shape at the end will give more soldering surface. Ends of the bands are soldered to the bottom of the flat plates. Filing of the *L* shaped end of the band will be necessary for comfort in wearing the ring. The outer edge of Plate *F* and the fused end of wire *D* are turned inward with a flat nose pliers. Fused end of wire *D* is forced into plate *F* causing a depression.

Ring No. 6 is designed for a long slender finger and is a unity of repeated horizontal and vertical open and solid spaces. Band and decoration are again united. Construction is similar to other rings. Plates *A*, *B*, and *C* are finished and soldered flat to band *D* which projects equally on either side of the decorative laminations. Square wire *E* is fitted and soldered to the top plate. The ring is shaped and sized on a mandrel and soldered together in the back. At this point, square wire *E* should be soldered to the band. Piece *C* is filed flush with the band where it overlaps the band. The thin weak projecting part of place *A* is protected by the surrounding wire in this ring design.

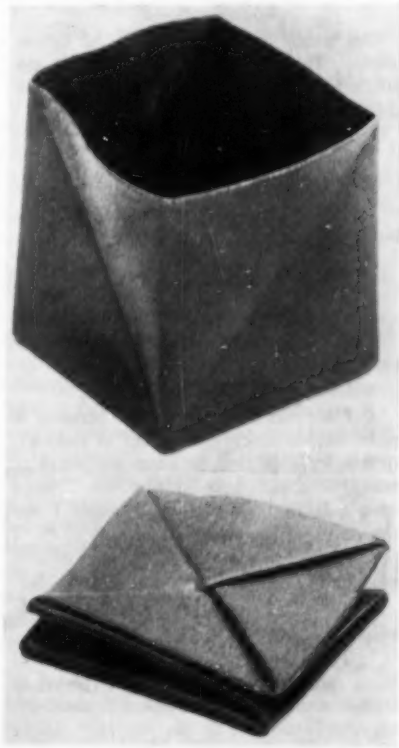
Construction details and development of shapes are not furnished for imitation of these particular rings; rather they suggest some of the solutions to creative thinking and design. Credits for the design and construction of these rings go to the following students of Waukesha High School, Waukesha Wis. Ring No. 1, Bradley Shreffler. Ring No. 2, Jack Leipsig. Ring No. 3, Jean Martin. Ring No. 4, Gail Kurtz. Ring No. 5, Alice Burk. Ring No. 6, Jean Wenniger.

FOLDING COIN PURSE

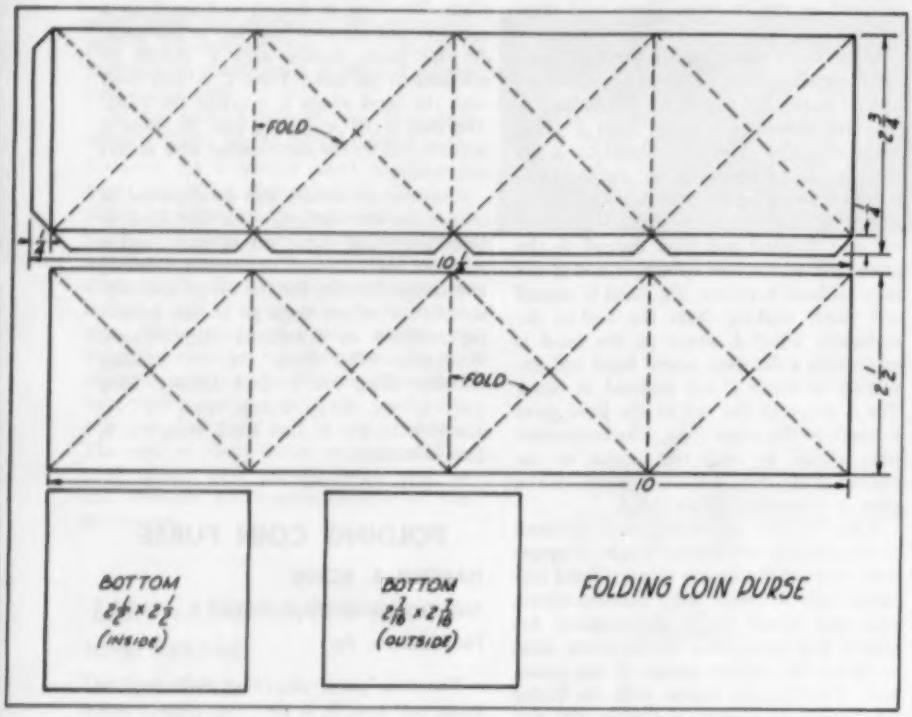
HAROLD B. ROHN
Stewart Junior High School
Norristown, Pa.

The coin purse described here may be made any size. It is very convenient, as it folds flat, has no snap to wear out, and it holds the coins securely, even when held upside down.

The purse is rather easy to make. It can be made in a single color, such as brown, red, green, or blue, but you can also use



A folding coin purse



Details of the folding coin purse

various combinations such as green for the outside and red for the inside.

Specifications

The purse is of two pieces of skiver leather. The skiver leather should be one ounce in thickness. A good leather cement should be used.

Tools and Materials

Steel square, knife, cutting board, tracer or modeler, cement, templates, and one block of wood 2½ by 2½ by 4 in.

Procedure

1. Lay out a paper pattern or template.
2. Cut out the four pieces of leather according to the patterns.
3. Cement the two sides together.
4. Place the cemented sides between a piece of waxpaper (as leather is porous), then newspaper, then between two pieces of wood, then put it under pressure. I have used a hand fruit press. In school I use the clamp of the paper cutter.
5. Crease a line on the inside, with a modeler, wherever the purse is to be folded.
6. Hand fold on the lines which you made with the modeler.
7. Take the 2½ by 2½ by 4-in. wood block and wrap the cemented piece of leather around, with the ¼-in. flap extending. Apply cement to the flap and cement the flap around the corner. Be sure to place a piece of waxpaper next to the block where the flap is cemented. This will help prevent the leather from adhering to the block when you wish to remove it.
8. Cut a piece of waxpaper 2½ by 2½ in., and place it on the end of the wood block where the inside bottom will be cemented in. This will prevent the leather from adhering to the wood block.
9. Cement the inside bottom in first. Be sure to get the corners cemented flat and neat.
10. Cement the outside bottom in place.
11. Remove the coin purse with care from the wood block. Let the cement dry for about 30 minutes.
12. Now fold the purse along the bottom seam carefully from *left to right*, on all four sides.
13. Place the purse under pressure in a hand fruit press, or the clamp of a paper cutter for several hours. Be sure to place waxpaper and newspaper between the two pieces of wood.
14. Apply a coat of wax to the inside and outside of the purse, then polish with a soft cloth.

The Federal Government now operates at least 100 businesses and has invested some 40 billion dollars in them. Many of these government business and commercial type of activities are in direct competition with private business. — *Chamber of Commerce of the U. S.*

INDUSTRIAL TOURS FOR THE INDUSTRIAL TEACHER EDUCATION PROGRAM

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Northwestern State College
Natchitoches, La.

"To develop in each pupil an active interest in industrial life and in the methods and problems of production and exchange," was one of the first objectives adopted by the A.V.A. Committee on Industrial-Arts Education. How much attention is given this objective by industrial-arts teachers depends upon their philosophy and existing local physical facilities. It is difficult to single out any one objective and emphasize it more than any of the rest. It appears, however, that a knowledge of industrial methods of production and distribution is one that receives the least attention in industrial-arts programs. That is especially true in the small community where there are few or no industries present. It might be argued by some that such a community has little need for an industrial-arts program in the local school system. This would be far from the truth since industrial arts is conceded to be a part of general education. Why should algebra, Latin, etc., be taught in a community in which there is no local demand for the trained product?

The question of what is the best method of studying industry may receive many and varied answers. The most common seems to be from textbooks and literature made available to industrial-arts teachers by industry. Within the past decade industry has developed quite an extensive public relations program and an important part of their work has been preparing and disseminating educational literature on their products. Certainly this is material well worth using by industrial-arts teachers. Unfortunately, many teachers feel they have done a good job orienting their students when the available literature has been studied. This is just the beginning. The most vivid impression is made by observing what goes on in industry through visitation.

For the purpose of giving industrial-arts majors experience in organizing and conducting industrial tours, the department of industrial education at Northwestern State College conducts three tours annually. The object of the first tour, made during the fall semester, is to observe specific operations and processes of manufacturing in industries representative of the areas offered in industrial arts. Industries visited are engaged in foundry work, machine tool manufacturing, printing, woodworking, electricity, engineering, and drafting.

The Industrial Arts Club of Northwestern State College, Natchitoches, La., just completed a tour through the Kaiser Aluminum plant in New Orleans

The second tour sponsored by the department is made by members of the industrial-arts club. This trip is taken shortly after the beginning of the second semester. The executive committee of the club works with the faculty adviser in planning the details. Some of the major problems to cope with are:

1. Contacting and securing permission from industries and working up a schedule for the tour (this is especially true where several industries are to be visited on a single trip).
2. Giving objectives or reasons for wanting to visit the plant.
3. Arranging transportation.
4. Making reservations for meals and sleeping quarters if the trip will require more than one day or part of a day.
5. Financing the trip.
6. Arranging with faculty for students to make up any class work missed.

The most recent trip made by the club was a three-day excursion to New Orleans. Industries visited in this area were: Esso Standard Oil Refinery, Godchaux Sugar Refinery, American Sugar Refinery, American Standard Radiator and Sanitation Company, American Can Company, Kaiser Aluminum, and the Celotex Company. It was coincidental that the date set for arrival in the Crescent City was the closing day of the Mardi Gras season. Had the students seen nothing more than the parade and the celebration by the masses of people they would have considered the tour successful.

The Industrial Arts Club on a tour through the Esso Standard Oil Refinery at Baton Rouge, La.

The objective of this type of tour is different from one made by a class whose interest is to observe industrial techniques in specialized crafts. Club member-interest is more of a general nature involving organization, personnel problems, sources of raw materials, labor and management relations, employment conditions, and widespread use of the product.

The third tour conducted under the direction of the department is made by the class in *organization and administration of industrial arts*. This class consisting of a group of industrial-arts majors visits industrial-arts shops and evaluates the physical facilities, equipment arrangement, type of program in operation, personnel organization, etc. A check sheet is given each student for the purpose of evaluation.

Some important values derived from planned industrial tours by an industrial-education department are:

1. Students acquire a knowledge concerning manufacturing methods.
2. The necessity of correlating school shops with industry is realized.
3. A better understanding is developed between the student and workman.
4. Good public relations between school and industry are cultivated.
5. The tours become a regular part of the potential industrial-arts teacher's education experiences while in college.
6. They serve as a means of contact for industrial-arts teachers in securing summer employment.
7. Industrial tours are the best method to use in realizing the objective *to develop in each pupil an active interest in industrial life and in the methods and problems and production and exchange.*

A properly planned industrial tour should be made an integral part of teacher-training programs in the field of industrial education. Prior to any tour a comprehensive preview should be made by the teacher and students listing specific things to be observed. Upon the return a class period or more should be used to evaluate and discuss the points of interest. The Industrial-Arts Club at Northwestern, meeting bimonthly, devoted a meeting to the discussion of the tour. The following statement from one of the students making the tour was typical of the responses made by many:

The tour to Baton Rouge and New Orleans was beneficial to me as an industrial-arts student because it broadened my practical experience which will be an asset to me as a future industrial-arts teacher. The sequence of events encountered on this tour supplied me with a generalized knowledge of a series of

industries directly and indirectly related to the field of industrial education.

All tours by the department are made on the college bus at a cost of two cents per mile. The department budget absorbs the cost.

A CASE BOUND MEMO PAD

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Abraham Lincoln Junior-Senior High School
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The project described herein is one that any graphic-arts budget can afford. Most of the materials can be obtained at local print shops or binderies at little or no cost. While this project is not original, it is well worth passing along for those who would like to offer an inexpensive case binding project in their graphic-arts course.

The students will have an opportunity to cover several operations valuable in graphic arts in a short period of time. The principles involved in binding this case are the same as used on regular books. Other operations include layout, padding or stitching, and trimming on the paper cutter. If desired the students can also marble the end sheets for the case, thus incorporating another operation in the project.

As mentioned before, many of these materials may be obtained at little or no cost. Binderies will nearly always have trim binders cloth large enough for this project, and many times they will have chipboard trim that will serve the purpose. Print shops are usually very generous with their trim stock, which will take care of the writing pad. If your material sources are good, this project can be made for about four cents.

The materials may be precut and put into kits, or the students may cut their own materials. If the materials are made up in kit form, the project can be completed in two to three one-hour periods. The size of the materials in the kit will depend upon how much stock you have been able to obtain, or wish to use. For the sake of specific instructions though, we will assume that the finished case will be 3 by 5 in.

The complete kit of materials for the case will contain the pieces shown in Figure 1. Two pieces of heavy chipboard, 3 by 5 in., to make the backing boards, one piece of index bristol 3 by 4¾ in. to form the pocket, one piece of railroad board ½ by 3 in. to stiffen the back of the case, one piece of twenty pound bond 2¾ by 10½ in. to form the end sheets, and one piece of binders cloth 3¾ by 11½ in. to cover the case. The materials for the writing pad will be gone into later.

The first operation will be to lay out the binders cloth for the chipboard backing boards and the railroad board stiffener. A ⅜-in. border should be left all the way around as shown in Figure 2.

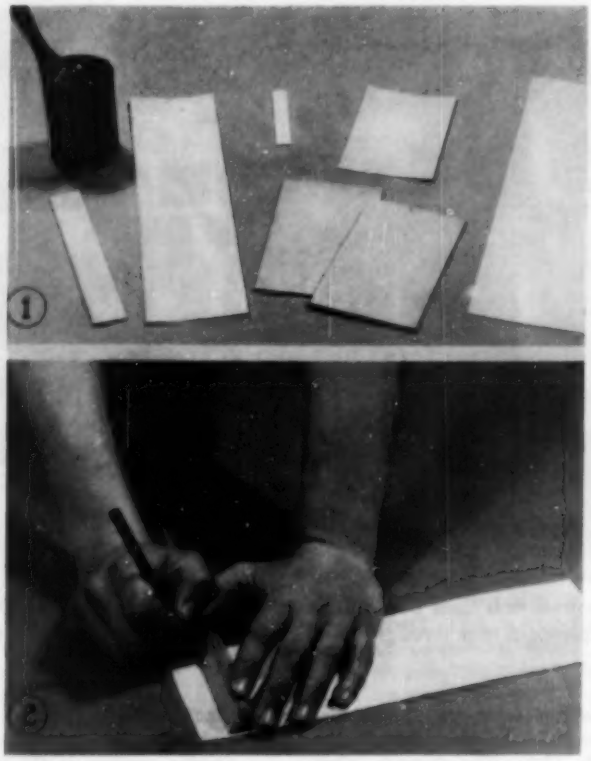

Fig. 1 (above). A complete set of materials for the case

Fig. 2. The lines for the chipboard and railroad board are laid out on the binders cloth

When the boards are cemented into place, the pocket is added as shown in Figure 3. Care must be taken in this operation to see that only three sides of the index bristol are cemented down. The cement must be kept on the edges only because the backing piece of our writing pad will have to slide into this pocket when we are finished. The short end of the index bristol will be kept to the center of the case. This will also be the open end of the pocket. The only reason the pocket is cemented at all, is to keep it in place until the binders cloth is folded over and the end sheets added.

The next step will be to fold the library corners as shown in Figure 4. This corner is formed by folding the cloth at a 45-deg. angle to the sides. When the corners are cemented into place, the sides and ends are folded around tightly and cemented.

Now the case is ready for the end sheets. If the end sheets are to be marbleized, allow them to dry thoroughly before cementing them in place. The end sheets are cemented right over the pocket as shown in Figure 5. The open end of the pocket can be located by feel after the case is dry. At this point it is advisable to allow the case to dry overnight in a book press, or under several reams of paper.

While the case is drying, the writing pad can be assembled. The materials for the pad will include one piece of scrap chipboard and a pad of 3 by 5-in. paper. The pad can be put together by stitching or by using padding cement. The padding cement is usually more satisfactory. The pad is left a full 3 by 5 in. so that the students will have the experience of trimming it to fit the case. The trim will be about ⅛-in. on the three sides.

The chip board for the back of the writing pad should be cut as shown in Figure 6. By doing this, the pad can be slipped into place without putting undue strain on the pocket. The shoulders on the chip board will rest on the short or open end of the pocket.

When the case has been thoroughly pressed and dried, the pocket may be opened. The pocket can be located by the ridge that it makes under the end sheet. To open the pocket, a sharp knife or razor blade may be used to cut along the ridge as shown in Figure 7. When the cut has been made, slip the knife or razor blade into the open end of the pocket to free it

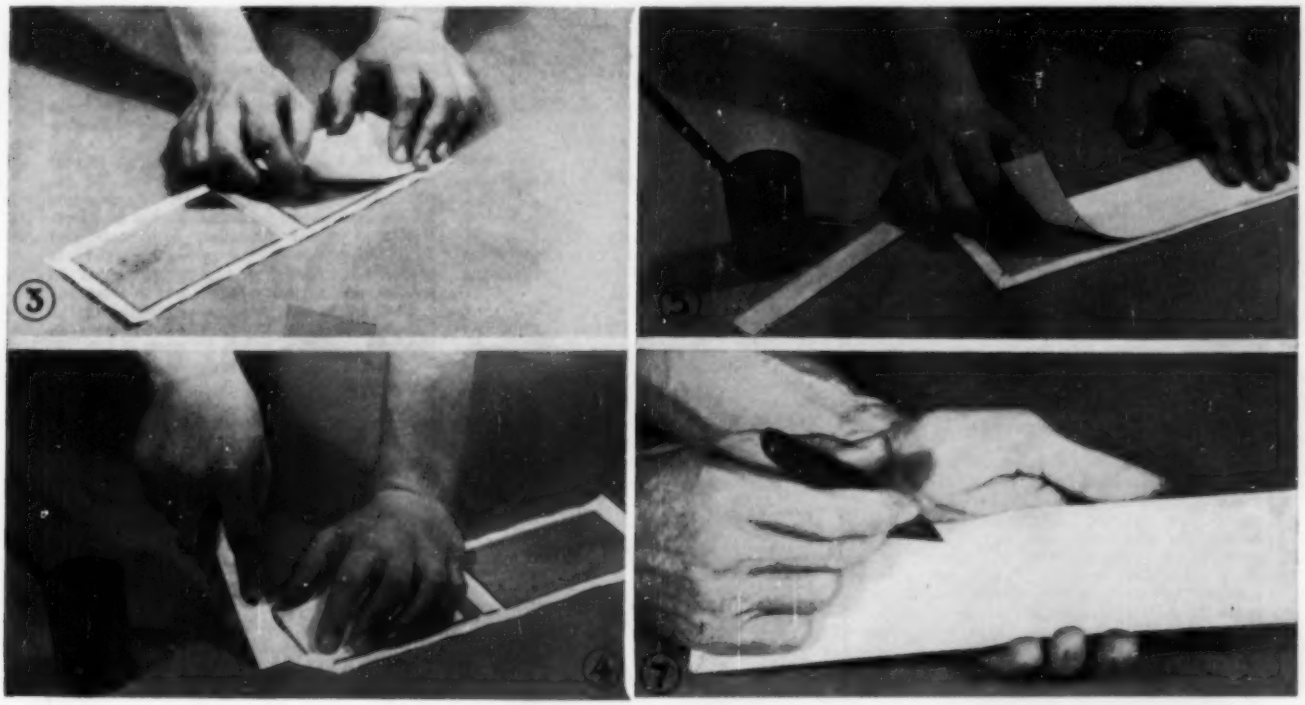

Fig. 3 (above). The pocket is placed in position with the short end toward the center of the case. Fig. 4. The library corner is formed by folding at a forty-five degree angle to the sides and creasing with a folding bone. Fig. 5 (above). The end sheets are placed in position with a ⅛ or 3/16-in. border on all sides. Fig. 7. The pocket is opened with a sharp knife or razor blade

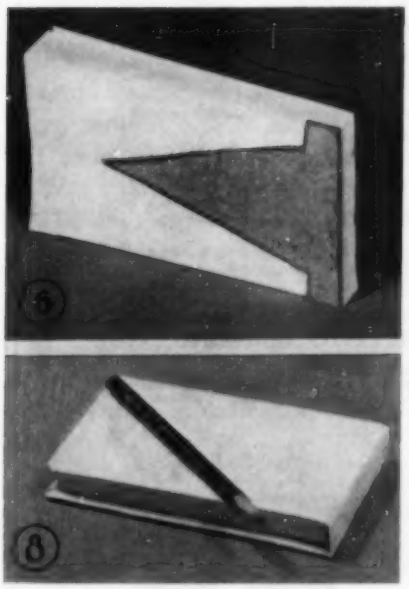

Fig. 6 (above). The backing piece of the writing pad is cut so that the shoulders will rest on the open end of the pocket Fig. 8. The finished product is a very useful and attractive item

of any cement that may have gone under the edge. Now the only thing that remains to be done is to slip the pad into the case. The end result is shown in Figure 8.

Another operation that can be added to this project is a printed writing pad. It makes a beginning presswork unit. Also, if you are fortunate enough to have a gold foil stamping machine, the students can put their names on the case.

Association News

THE 1954 AVA CONVENTION

That historical and picturesque city of the west — San Francisco — did a fine job of hospitality when the 48th annual vocational convention of the American Vocational Association held its annual meeting there December 3 to 7, 1954.

While the meetings were held at quite a distance from the downtown hotels, and while the skies were very generous with their donations of rain, nevertheless, the many meetings scheduled by the program makers were all well attended. This was true even of the Sunday sessions, some of which were held both in the morning and in the afternoon.

While the convention of the American Vocational Association started on December 3, some groups, like the National Association of State Supervisors of Trade and Industrial Education and the National Council of Local Administrators of Vocational Education and Practical Arts started their meetings on December 1.

At the meeting of the National Council of Local Administrators of Vocational Education and Practical Arts on Wednesday, December 1, the problem for discussion was how to use public relations effectively in connection with vocational and practical arts education. L. E. Wass, director of industrial and adult education, Davenport, Iowa, was the chairman, and the main address was delivered by Douglas Whitlock, chairman of the board and general counsel, Structural Clay Products Institute, Washington, D. C.

The need for developing architectural standards for vocational facilities was studied at the Thursday morning session.

Rex H. Smelser, director, Sowela Vocational-Technical School, Lake Charles, La., was chairman.

The experiences of local directors were presented by John Arundel, director, vocational education, Cincinnati Public Schools, Cincinnati, Ohio; Charles W. Sylvester, assistant superintendent, Baltimore Public Schools, Baltimore, Md.; Robert J. Stoffer, assistant superintendent in charge of buildings and grounds, San Francisco Public Schools, San Francisco, Calif.; and architect John Lyon Reid, representing committee on school buildings, American Institute of Architects, San Francisco, Calif.

The subject of advisory committees was discussed Thursday afternoon, and their functions and operations on the local level were presented.

Howard E. Marvin, director of vocational education, Pasadena, Calif., acted as chairman.

The speakers were Charles J. Foehn, business manager, Local Union No. 6, International Brotherhood of Electrical Workers, San Francisco, Calif.; Elmer F. Sproule, training manager, Hughes Aircraft Company, Culver City, Calif.; Mack Stoker, regional supervisor, industrial education, Los Angeles, Calif.; and Rex H. Smelser.

The meeting on Friday morning was devoted to a discussion of labor and management relationships with vocational education on the local level.

A luncheon and business meeting was held at noon and the business meeting in the afternoon terminated the convention activities of this group.

The officers for 1954–55 are: president, C. L. Greiber, Wisconsin; vice-president, Wes Smith, California; secretary-treasurer, John Walsh, New Hampshire.

NATIONAL ASSOCIATION OF INDUSTRIAL TEACHER EDUCATORS

At the Thursday, December 2, session of this organization, under the chairmanship of William J. Micheels, chairman, industrial education, University of Minnesota, Minneapolis, Minn., the discussion was on co-operative curricula for the preparation of trade and industrial teachers; college accreditation for industrial institutes; and the NAITE filmstrip project, analysis technique for instructors; and a progress report of the NAITE filmstrip project and lesson planning was received.

Speakers at this meeting were: Paul E. Powell, Alpine, Tex.; Stanley Roe, Detroit, Mich.; John R. Jarvis, Menomonie, Wis.; and A. A. Vezzani, Ann Arbor, Mich.

Thursday afternoon the problems of teacher education were discussed.

The chairman of the meeting was Melvin L. Barlow, University of California, Los Angeles, Calif.

Kenneth Phillips of San Diego College spoke on the recruitment of prospective teachers; and Heber Sotzin of San Jose State College, discussed the selection of prospective teachers.

Einar Siro, Chico State College, presented the subject of training of industrial education teachers.

Teacher placement was the subject chosen by Thomas Dean of Long Beach, Calif.; and Kermit Seefeld of Santa Barbara College, spoke on counseling; and Marion Grosse spoke on follow-up.

The Friday morning meeting was devoted to a discussion of research in industrial teacher education.

The meeting Friday afternoon was on teacher education services in a functional program of trade and industrial education, and improving industrial-arts teacher education relationships.

On Saturday morning a luncheon meeting was held, and this was followed by the business meeting.

The General Meetings

At the opening general session, Friday, December 3, at 7:30 p.m., addresses were given by James A. Brownlow, president, metal trades department, American Federation of Labor, and chairman, A.F. of L. Subcommittee on Vocational Education, Washington, D. C.; and Douglas Whitlock, chairman of the Board of General Counsel, Structural Clay Products Institute, Washington, D. C.

Immediately following, state certificates were given to the graduating apprentices.

The second general session was held at 7:30 p.m. Saturday, December 4.

Edwin A. Lee, first president of the American Vocational Association, and dean, School of Education, University of California, Los Angeles, Calif., gave an inspiring address in which he called attention to the fact that we of the atomic age have seen many of the forces of nature unraveled. The U. S. and Soviet Russia now possess the means to kill practically all life on earth.

While we now possess wonderful inventiveness and power almost unlimited, we must not forget the Creator of all nature, nor that we are still mere pygmies in His hands.

Kenneth C. Ray, director, education division, Foreign Operations Administration, Washington, D. C., pointed out that we must educate the peoples of the world that they need not live under the threat of hot and cold war. We must teach them to help themselves and improve their lot. Technical skill alone is not enough. Communists make use of technology and vocational skill to create a modern Frankenstein. We must help these underpriviledged peoples to develop themselves.

On Sunday evening the Standard Oil Company invited the AVA delegates to the San Francisco Symphony Orchestra program. Unfortunately, Sunday evening was particularly moist, and the audience for this beautiful program was regrettably small.

The AVA banquet and dance was held on Monday evening.

Herbert C. Clish, superintendent of public schools, San Francisco United School District, San Francisco, Calif., was toastmaster, and the main speaker was Adrian J. Falk, president of S & W Fine Foods, San Francisco, Calif.

He pointed out the shortcomings of our age and how we must seek to put more spirituality into our lives.

Ray M. Karnes, Urbana, Ill., and G. Harold Silvius, Detroit, Mich., reported on city in-service programs, state education departments and teacher education; relationships of industrial-arts teacher education with state and local supervision; regional industrial-arts teacher education groups; and progress in industrial-arts teacher education evaluation.

The policy and planning committee of the industrial-arts division held their meeting on Saturday morning.

One of the Saturday afternoon sessions discussed craft experiences in junior high schools.

Ross Cramlett, supervisor, adult education program, Des Moines, Iowa, acted as chairman.

John Boghosian, instructor, A. P. Giannini Junior High School, San Francisco, Calif.; and Calvin R. Welsch, instructor, industrial

(Continued on page 4A)

THE SHIP PAYS TRIBUTE TO

CLAUDE EUGENE NIHART

Members of THE SHIP salute you — CLAUDE EUGENE NIHART, distinguished son of Kansas and California — Head of Industrial Arts Teacher Education Department at Los Angeles State College, Los Angeles, California.

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- ... improving and extending educational opportunities and raising standards
- ... your contribution to industry through education
- ... your influence and guidance which inspire all
- ... serving your City, your State, and your Country by contributions to the youth of our times
- ... your broad vision and unreserved faith in the American way of life.

CLAUDE EUGENE NIHART, we of THE SHIP are privileged to honor you by paying public tribute to your fine constructive Educational Leadership — we salute you for your

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Given under our hand and seal this Seventh Day of December, One Thousand Nine Hundred and Fifty-four, A. D., at the Forty-eighth Annual Convention of the American Vocational Association in San Francisco, California.

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ASSOCIATION NEWS

(Continued from page 8A)

It was felt that the alliance with the national organization would be beneficial to our group as well as to the individual members.

Plans for participation in the state-wide industrial-arts fair for the spring of 1955 were discussed. The program of last year was reviewed and mention made concerning revisions for the year in progress. The fair is sponsored by the Industrial Arts Club of Eastern New Mexico University of Portales. The club members raised a $100 scholarship for the winner of the outstanding award. The fair program is patterned on the Industrial Arts Awards program which is sponsored by the Ford Motor Company. — *W. R. Forkner.*

NORTH CAROLINA INDUSTRIAL ARTS ASSOCIATION

The North Carolina Industrial Arts Association held its sixth annual fall meeting at Lexington Senior High School, Lexington, N. C., Saturday, November 13, 1954.

The meeting began at 8:30 a.m. with a two hour guided tour through the United Furniture Corporation. The enthusiasm aroused by this trip, which began with the rough lumber and continued through until the finished item was crated and ready for shipment, necessitated two tours.

Following a brief message of welcome by C. E. Wike, principal of Lexington Senior High School, a business meeting was held in the library presided over by Tom Haigwood, president.

Plans and preparation for the Fourth Annual State Project Fair to be held at Myers Park High School, Charlotte, N. C., May 7, 1955 were discussed. It is hoped that every shop teacher in the state will send projects and attend this meeting. Projects should arrive on Friday afternoon or very early Saturday morning. — *K. C. Sinclair.*

THE 1954–55 KANSAS INDUSTRIAL EDUCATION ASSOCIATION OFFICERS

President — Clarence C. Youse, Junior High School, Dodge City; secretary-treasurer — D. W. Lake, Roosevelt Junior High School, Coffeyville; vice-presidents — Leon L. LeGresley, Highland Park, Topeka; John C. Powell, Northwest Junior High School, Kansas City; Leo G. Folck, Winfield High School, Winfield; George M. Duerksen, East High School, Wichita; Homer M. Templin, High School, St. John; and Robert Britten, High School, Kays, Kans.

THE 1954–55 KANSAS VOCATIONAL ASSOCIATION OFFICERS

President — Charles Mantz, vocational agriculture instructor, Smith Center; vice-presidents representing:

Homemaking: Miss Helen Steele, chairman, Vocational Homemaking Association, Washburn Rural High School, Topeka;

Part-time Occupational Education: Louis Cagle, president, Coordinator-Instructors Association, office practice instructor, High School, Topeka;

Industrial Education: Clarence Youse, president, Kansas Industrial Education Association, industrial arts instructor, Junior High School, Dodge City;

Agriculture: Charles Mantz, president, Vocational Agriculture Association, Smith Center, Kans.;

Secretary-treasurer — F. E. Carpenter, vocational agriculture instructor, Highland Park Rural High School, Topeka, Kans.

AMERICAN PERSONNEL AND GUIDANCE ASSOCIATION CONVENTION

The American Personnel and Guidance Association will hold its 1955 national convention at the Conrad Hilton Hotel in Chicago, Ill., April 3 to 7, 1955. *Guidance and Personnel Work in a Dynamic Society* will be the convention theme.

Dr. Gardiner Murphy, director of research at the Menninger Clinic, Topeka, Kans., will be the keynote speaker.

Other high lights of the meeting will be a college presidents' panel and a U. S. Department of Health, Education and Welfare report.

LOS ANGELES COUNTY INDUSTRIAL EDUCATION ASSOCIATION

New officers for the Los Angeles County Industrial Education Association for the school year 1954–55 are: Keith E. Gummere, president; Ed Roberts, vice-president; Ted Knudsen, secretary-treasurer; and advisers, David Taxis, co-ordinator of industrial arts for Los Angeles County; and Lee Rawston, director of vocational education and industrial arts for Los Angeles County.

Committee chairmen for the association this year are: Television Committee, Ray Cole, El Monte High School; Liaison Committee, Floyd Honsburger, Clark Junior High School, La Crescenta; Institute Planning Committee, Ed Roberts, Whittier High School; Student Award Committee, Bob Schottlen, Inglewood High School; Nominating Committee, Stanley Carr, Enterprise Junior High School, Compton; Publicity Committee, DeWeese W. Stevens, Rosemead High School; and Official Photographers, Earl Wilbert, Rosemead High School, and Clifford Dobson, Burbank Unified Schools.

The next meeting of this organization was held December 10, 1954, at East Downey Junior High School, Downey, Calif. The meeting was conducted by Keith E. Gummere, president.

The program started at 5:30 p.m., with all shops open for visitation. Dinner was served at 6:30 p.m., in the school cafeteria. The featured item of the program was a presentation of "Do-It-Yourself" by the Reynolds Aluminum Company of Los Angeles. — *DeWeese W. Stevens.*

PENNSYLVANIA INDUSTRIAL ARTS CONVENTION

The second annual convention of the Industrial Arts Association of Pennsylvania held in Hershey on October 22 and 23 was a great success. More than 265 industrial-arts teachers from all parts of the state were in attendance for what proved to be an excellent conference.

The program for Friday morning included registration, tours of the Milton Hershey Junior-Senior High School, Derry Township Junior-Senior High School, Hershey Chocolate Corporation, and the Hershey Lumber Company.

The afternoon session was held in the Little Theater of the Hershey Community Center when a number of outstanding speakers presented various phases of the educational shopwork program.

On display in the lobby of the Hershey Community Building was one of the greatest displays of tools, materials, and books relat-

(Continued on page 17A)

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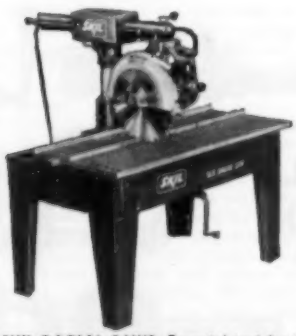

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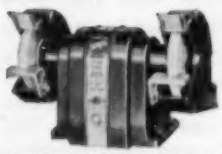

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The Parks No. 20. 20" Planer has a 4-knife cutterhead with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M., and 40 and 80 F. P. M. Will take work up to 20" wide by 6" thick. Ruggedly built for vibrationless operation.

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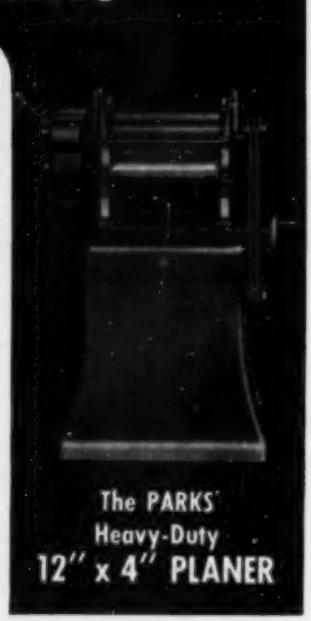

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ASSOCIATION NEWS

(Continued from page 14A)

ing directly to our work ever brought together under one roof.

The banquet was held on Friday when the two principal speakers were John M. Hurley, director of industrial arts education, New York City, who spoke on "Taking Stock," and John B. Shenk of Millersville State Teachers College, who spoke on and demonstrated the use of "The Mental Magic of Hypnosis."

An outstanding part of the program was presented on Saturday morning in the Community Center Social Room. Experts in the various phases of industrial arts gave demonstrations of such work as pottery making, art-metal work, wood turning, weaving, leatherwork, silk screen printing, and the like.

MONTANA INDUSTRIAL ARTS CONVENTION

The Montana Industrial Arts Association held its state convention, October 28 and 29, 1954, at Rocky Mountain College, Billings, Mont.

A get-together for industrial-arts teachers was held for the arrivals at the Green Room in Northern Hotel at 8:00 p.m., on Wednesday, October 27.

The registration and general session was held at 8:00 a.m., on Thursday at the Lincoln Junior High School.

The business meeting of the Montana Industrial Arts Association was held at 1:00 p.m., on Thursday.

A shop planning session was held at 3:00 p.m., and the Montana Teachers' Association banquet was held at 6:30 p.m., on Thursday.

There were several tours planned to local industries, on Friday morning.

The afternoon was set aside for visiting the exhibits of new machinery, material, and literature that was displayed at North-South Hall in Lincoln Junior High School.

The industrial-arts teachers' banquet with entertainment was held at 6:00 p.m. Howard Vanover acted as toastmaster.

The speaker of the evening was Dr. W. J. Micheels, University of Minnesota, who chose for his subject "The Challenge of Creativity."

THE T. AND I. EDUCATION ASSOCIATION

At a recent meeting of the T. and I. Education Association at Pittsburgh, Pa., the main discussion centered around co-operation between industry and school.

The high lights of the discussion were:

1. Criticism of shop teachers usually centers around the fact that we have lost contact with industry, their methods, and techniques, and consequently, our teaching methods are not current.

2. Summer work should be available to correct the above mentioned criticism and shortcomings.

Summer jobs in industry will help greatly in acquiring new techniques and know-how; and in addition, a co-operative relationship between management and organized labor will be of untold value to all groups.

3. Business, teachers, and unions must co-operate to help in bringing this about.

4. The conclusion of the panel was that we should get some organization such as the Buhl Foundation, or some similar group, to help make this co-operative working arrangement possible.

Officers of the organization are: E. A. Liberator, president; William Borland, first vice-president; Olan T. Mahaney, second vice-president; J. Earl Krotzer, secretary; and Ward W. Swain, treasurer.

♦ The Allegheny County branch of the Industrial Arts Association of Pennsylvania held their last meeting on December 15 at 7:15 p.m., at the Glenwood Diesel Shop of the B. & O. Railroad.

Personal News

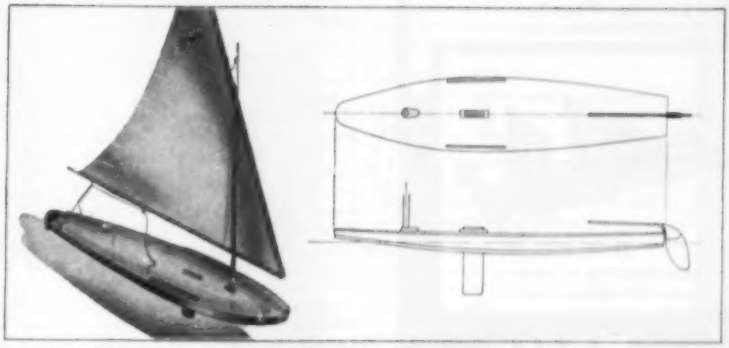
U. G. WHIFFEN TAKEN BY DEATH

U. Glenn Whiffen, for 22 years head of the Washington State College industrial arts department until his retirement last September, died suddenly of a heart attack at Lewiston, Idaho, Saturday morning, November 27, 1954. Mr. and Mrs. Whiffen had recently purchased a trailer after selling their Pullman home and were preparing to leave on a leisurely trip south when death intervened. Mr. Whiffen, who was 59, had suffered from a heart condition for a number of years.

Mr. Whiffen was born on April 8, 1895 at Horton, Kans. He was the son of John and Emma Whiffen. He remained at Horton until the age of 21 when he entered the service of his country. During World War I he was a member of the famed Rainbow Division. He was one of the first one-hundred-thousand men who went overseas. In his experiences at the front he took part in five major battles of World War I: St. Mihiele, Chateau Thierry, the Meuse, the Argonne, and the Lorraine Sector. On the night before the Armistice was signed he was severely gassed and was returned to this country a casualty.

(Continued on page 18A)

FIBERGLASS PROJECT OF THE MONTH



This sealed pontoon-type "SAIL-BOARD is a full size boat — *not a model*. It is 12 foot long, with a 33 inch beam and carries 65 sq. ft. of sail on its 10 foot mast. Light — safe — easy to build. The sleek, leakproof finish is accomplished with Castoglas-Fiberglass.

WHAT BOY WOULDN'T LOVE to own the sporty sailing surfboard shown here, and be able to say *"I built it myself!"* The original was skillfully designed by Russell Robinson of Milwaukee, Wisconsin, a veteran experienced sailing enthusiast. To build this craft will be a truly exciting project, bound to put every boy on his best behavior. Vibrantly alive, this adventure appeals to everyone's Huckleberry Finn spirit. The completion of the project is the beginning of real fun and adventure. In just a few minutes, anyone can learn the knack of skimming the "sailboard" over the water in the lightest breeze!

Russell Robinson fiberglassing the "Sailboard" hull.

A Fiberglass Project for the Wood Shop Educational — Practical — Economical

Simplicity of design and easy-to-follow directions make this an ideal project for the wood shop *and adult* evening classes. Thin plywood forms the greater part of the hull, but we supply a limted number of special parts such as the precision-cut stem block, transom and stations which form the very heart of the design. Our primary purpose, of course, is supplying the Castoglas laminating resin and the fiberglass fabric.

Caulked and Painted — Once and For All!

This sailing craft never needs caulking or painting! Color is *built right into the construction* by mixing especially prepared pigments into the resin. The fiberglassed hull cannot rust, corrode or crack in any kind of weather — 50° below or 100° in the shade. The strong, resilient hull will not swell in the water or contract on the high and dry beach! It's *really* permanently waterproofed with Castoglas-Fiberglass. *Isn't that something?*

Write for the Free Marine Edition of "The Castoliter"

The January edition of "The Castoliter" describes and illustrates this project in full detail. *Of interest to instructor in wood and metal are the many other fiberglass and Castoglas applications described.* Reprints of the Bick articles describing the use of Castoglas resins and fiberglass for forming table tops, bowls, lamps, chairs and boat models (with detailed drawings and directions) are available to *teachers* for the asking. Write to:

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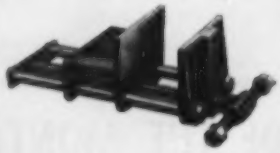
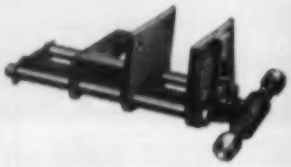


18-A DUAL PURPOSE
WOODWORKING VISE



CONTINUOUS SCREW
WOODWORKING VISE

TAKE YOUR PICK

from the complete
MORGAN LINE

Your School Shop will be better equipped when you specify, and insist on, Morgan Vises. You have your choice of a complete range of sizes and types with Morgan's Woodworkers' (with exclusive tubular steel handle), Machinists', Pipe and Combination Pipe Vises. Every vise UNCONDITIONALLY GUARANTEED.

Write for complete catalogue.

MORGAN
VISE COMPANY
112 N. JEFFERSON ST.
CHICAGO 6, ILLINOIS

PERSONAL NEWS

(Continued from page 17A)

After his recovery, he attended Kansas State Teachers College at Pittsburg, Kansas, and also Iowa State College at Ames, Iowa, where he secured his bachelor of science and master's degrees, respectively.

During his college career, he was united in marriage to Jessie O'Dell, of Pittsburgh, Kans.

Professor Whiffen began his teaching career at Excelsior Springs, Mo., as supervisor of industrial arts. He remained there for three years. Then he moved to the College of Education of Missouri at Marysville, Mo., where he was chairman of the department of industrial arts. He remained here for six years, after which, in 1932, he moved to Pullman where he was appointed chairman of the department of industrial arts at Washington State College.

Because of a severe heart condition he retired from his position at Washington State College last September.

Professor Whiffen was a member and faculty adviser of Phi Sigma Kappa, a member of Crimson Circle (Men's Service Honorary), Phi Delta Kappa (Educational Honorary), Epsilon Pi Tau (Industrial Arts Honorary).

Before his severe illness he was a member of the American Association of University Professors, the YMCA Board on the State College of Washington campus, and a member of various faculty committees on the same campus. Professor Whiffen considered it a special honor when he and his wife were invited by Pine Manor, a men's co-operative on the campus of Washington State College, to become their advisers. They lived there from 1937 to 1942.

During World War II years Professor Whiffen acted as dean of men on the State College campus.

Immediately after World War II he was chosen by Dr. Holland to set up a Veteran's Study Program, also at the State College of Washington, and became Veteran's advisor. At his own request after the Veteran's program had been set up he went back to his classroom work until his retirement.

Due to his wide experience and contact with the youth of our state, Professor Whiffen has had a rare opportunity to offer personal service in many fields. He has been a warm friend, a wise counselor, and an able teacher. — *W. A. Bakamis.*

M. REED BASS RETIRES

M. Reed Bass, who headed The David Ranken, Jr., School of Mechanical Trades as director since 1937, recently announced his retirement as of September 30, 1954. Since coming to Missouri, Director Bass has been tireless in his efforts to help promote vocational education in this state. He thus closes, by his voluntary retirement, nearly forty years in the field of vocational education. As a very young man he gave up a position as shop foreman in one of the largest automobile repair plants in Minneapolis to go to the Dunwoody Institute as instructor in automobile repair. There he was head of the automobile department for two years, and then was promoted to the position of principal. Shortly after World War I, he was made assistant director, a position which he held until the spring of 1937, when he was asked to come to St. Louis as director of The David Ranken, Jr., School of Mechanical Trades.

During his many years at Dunwoody, he was very closely associated with Dr. Charles A. Prosser. It was from Dr. Prosser that Mr. Bass absorbed much of the philosophy, the

(Continued on page 20A)

Check Your
Saw Blade Costs...

and settle on
SIMONDS
SI-CLONE
SAWS

Put Si-Clone Saws to work and you'll be dollars ahead. You cut faster, get a better finish, and make many more cuts between sharpenings. Low in price yet so well made, they're *guaranteed* to give you satisfaction. Available in 13 different types of blades up to 12" diameter . . . including Dado Heads and Carbide-Tipped . . . to fit all machines. Buy them from your Mill Supply or Hardware Dealer today.

Rip, Cut-off and Combination Saws:

6"	1.75
7"	2.00
8"	2.15
9"	2.65
10"	3.15
12"	4.35

Supplied with round or special shape holes for all machines.

GUARANTEE
Made of SIMONDS STEEL fully guaranteed against any defect in material or workmanship.

SIMONDS
SAW AND STEEL CO.
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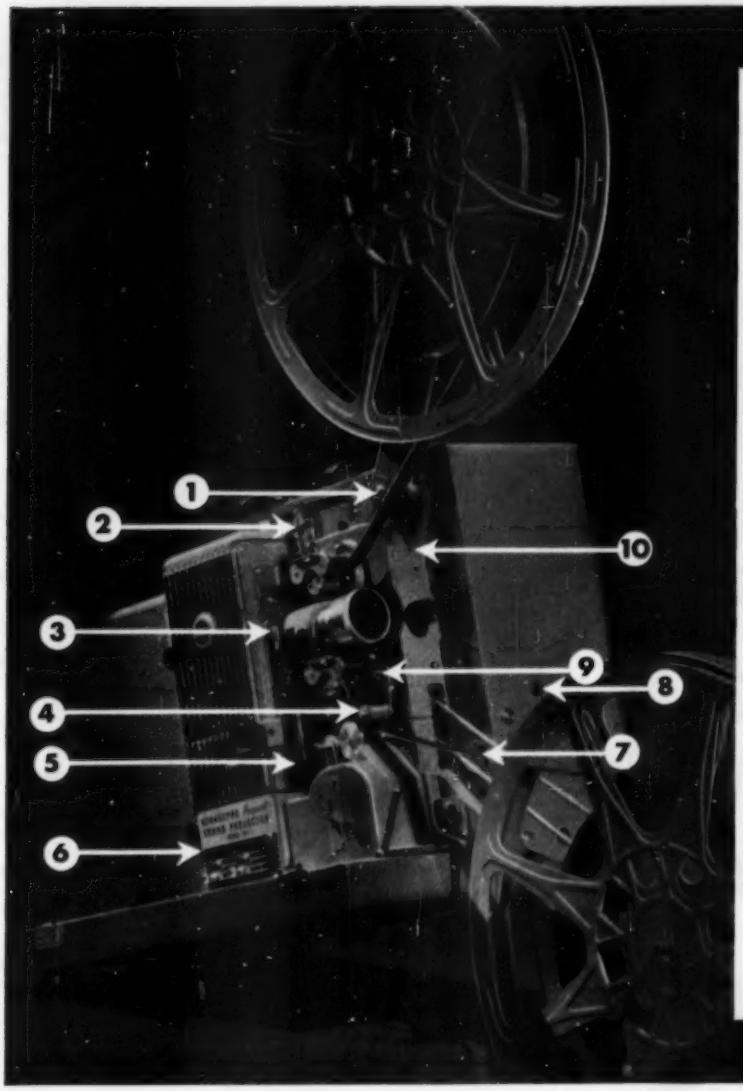
Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon. Canadian Factory in Montreal, Que.

The best in 16mm. Sound-Movie Projection . . .
Now 10 ways better!



1. SPEEDIER SETUPS
Attached, hinged reel arms speed projector setups and takedowns; prevent damage to drive belts.

2. SURER SETUPS
Handy "knee-action" rewind lever guards against threading projector in rewind position.

3. SMOOTHER FILM TRAVEL
Film gate with precisely adjusted "floating pressure" provides optimum film-handling characteristics.

4. EXTRA FILM PROTECTION
Shock-damping, pivoted roller protects film from take-up stress . . . eliminates friction-caused wear.

5. FASTER THREADING
Built-in loop former speeds up threading. Also lets you restore "lost loops" without stopping.

6. EXTRA SAFEGUARD
Fuse system conveniently located at rear of lamphouse provides additional amplifier protection.

7. LOWER MAINTENANCE COSTS
Access port to governor makes periodic governor "overhaul" a fast, simple adjustment.

8. SIMPLER CENTERING
Improved elevation mechanism with push-button release provides faster, steadier, surer centering.

9. EASIER ADJUSTMENTS
Release button makes belt changes fast and easy. Handier access to exciter and projection lamps, too.

10. ADDITIONAL RUGGEDNESS
Entire main mechanism is now a single casting. Extra ruggedness for the most durable of all 16mm. sound projectors!

KODASCOPE PAGEANT SOUND PROJECTORS

AND . . . only Pageants offer all the following top-important projector features

Permanent pre-lubrication eliminates under- or over-oiling, major cause of projector breakdowns. *Fidelity Control* enables you to get the most from any 16mm. optical-sound track. *Built-in field-sharpening element* provides super-sharp pictures over the entire screen area. *Nylon gearing*, low-speed gear operation, and a simplified mechanism make Pageants quiet as a whisper. *True-rated amplifiers* of either 7- or 15-watt output give you top-quality sound reproduction. And in "Plus-40" models, a super-brilliant shutter throws 40% more light to make your pictures extra bright in hard-to-darken rooms.

Ask your Kodak Audio-Visual Dealer to show you the new Pageant models. Or just mail the coupon for a brand-new color catalog of all Kodascope Pageant Sound Projectors.

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Please send name of nearest Kodak Audio-Visual Dealer and a free copy of your new catalog of Kodascope Pageant Sound Projectors.

NAME _____ TITLE _____
ORGANIZATION _____
STREET _____
CITY _____ (Zone) _____
STATE _____

Kodak

PERSONAL NEWS

(Continued from page 18A)

understanding, and the training for leadership in this great field.

Mr. Bass is the author of numerous articles on vocational education. With Dr. Prosser he coauthored the book on Adult Education published by the Appleton-Century Company. He wrote the book, *Fifty Hints for Teachers of Vocational Subjects*, published by the American Technical Society. He is the author of *A Manual for Instructors in CCC Camps* under the U. S. Office of Education. Following World War I, he made a survey of autobile manufacturing plants, including the Ford Motor Company of Detroit, Mich., in which he studied the jobs that disabled veterans could perform in this industry. This study was done for the U. S. Government, and a monograph was written covering this study. In 1944, Dr. J. C. Wright, Assistant Commissioner of Education, U. S. Office of Education, asked him to serve as chairman of a committee on the study of postwar vocational education. The committee's report is Bulletin No. 234, U. S. Office of Education, "Vocational Education in the Years Ahead." Out of this study developed the now famous "Prosser Resolution" concerning the 60 per cent of American youth who are not adequately served by most public high schools.

Mr. Bass was associated with many important groups. He is a member of the St. Louis Chamber of Commerce, Kiwanis Club, Phi Delta Kappa, Iota Lambda Sigma, American Association of School Administrators, American Association of Technical High Schools and Institutes, American Society of Training Directors, National Education Association of the United States, American Vocational Association, National Vocational Guidance Association, and Missouri Industrial Education Association, of which he is a past president, and Missouri Vocational Association. He also served as an active member of the Educational Committee of the Lithographic Technical Foundation and as a director of the Adult Education Council of Greater St. Louis. For a number of years he was a member of the faculty of the Department of Education of the University of Minnesota and of Colorado State College. For a period of approximately seven years, prior to 1941, Mr. Bass held a commission as lieutenant in the U. S. Naval Reserve. During World War II he was appointed as an expert consultant to the Secretary of War by Gen. George C. Marshall.

RANKEN HAS A NEW DIRECTOR

George B. Rodenheiser, who for the past 16 years has been assistant director at The David Ranken, Jr., School of Mechanical Trades, succeeded the former director, M. Reed Bass, upon his voluntary retirement September 30, 1954, as director of that institution. Mr. Rodenheiser has had nearly thirty years of association with the school as department head and as assistant director.

The position of assistant director has been filled by the appointment of Hal Gilker. Mr. Gilker formerly held the position of assistant to the director.

FOR TOP VALUE

Choose your next braces from these outstanding Millers Falls favorites

It's not just chance that Millers Falls bit braces rank as the world's largest-selling quality line.

Shown here are four of the reasons why. Each is ideal for school shop use — each is designed and built to give you dollar for dollar the biggest values money can buy.

You'll find these smooth-acting, accurate tools help bring out the best work your students can do. And you'll find, too, that Millers Falls rugged braces are great budget-stretchers — long wearing tools that stand up under tough school shop use and last for years.

Join the thousands of instructors who have standardized on Millers Falls braces for their shops. In every price range — for every boring job — there's a Millers Falls Bit Brace that's tops.

MILLERS FALLS COMPANY
Greenfield, Mass.

MILLERS FALLS TOOLS
SINCE 1868
The Mark of Superiority

No. 1950
A new leader in the medium price class. Unbreakable head and handle of glossy red "Tenite" make it a perfect choice for school shops. Ball bearing head, forged jaws, Barber chuck.

No. 1322
One of the most popular bit braces ever made. Sturdy, boxed ratchet mechanism. Barber chuck with self-opening, forged steel jaws. Ball bearing, steel clad head of mahogany finished hardwood.

No. 732
Popularly known as the "Heidall," this fine quality brace is equipped with a universal type chuck holding square, taper and round shanks from 1/8" to 1/2" diameter. A brace that's hard to beat for all round school shop use.

No. 772
Preferred by expert craftsmen everywhere. A beautifully finished tool with full ball bearing construction. Lion universal type chuck, head and handle of fine grained tropical hardwood. All exposed metal parts heavily plated and highly buffed.

New Publications

Bench Metal Work

By Robert E. Smith. Paper, 72 pp., 7¼ by 10¼ in., illus., $1. McKnight & McKnight Publishing Co., Bloomington, Ill.

An interesting text well written and illustrated.

It treats of safety at work, metals used in benchwork, measuring and laying out, the bill of materials, holding devices, hack saws, and how to use them, files, shears, pliers, nippers, cold chisels, how to bend and twist cold metal, metal fasteners, punching and drilling holes, rivets and riveting, forming curves and scrolls, wrenches, taps, stocks, dies, cutting threads, pipe fitting, producing hammered effects on metal and applying oil, lacquer, enamel, and wax finishes on metal.

The book also contains some tables useful to the worker using metals.

Handbook of Building Terms and Definitions

By Herbert R. Waugh and Nelson L. Burbank. Cloth, 421 pp., 5¾ by 7¾ in., illus., $5. Simmons-Boardman Publishing Corp., New York 7, N. Y.

A very useful dictionary of terms used by those working at the builder's trades.

The book contains quite a number of illustrations. The appendix contains drafting symbols for sectioning, architectural drafting symbols, geometric figures, and the names and pictures of pipe fittings.

Layout of Advertising and Printing

By Charles J. Felten. Cloth, 172 pp., 8¼ by 11¼ in., illus., $6. Appleton-Century-Crofts, Inc., New York 1, N. Y.

This is the third edition of this helpful book in which the author presents the theories, techniques, and procedures which he has developed through much study and many years of experience.

(Continued on page 23A)

THE HEAD INSPIRES—THE HANDS RESPOND

FORD I.A.A. PROGRAM promotes teacher-student teamwork

In its 1955 Industrial Arts Awards Program, Ford is continuing to stress the importance of teamwork between teacher and student.

Although all of the IAA projects are the work of students in grades 7 through 12, it is the Industrial Arts teacher who guides and advises.

There will be professional recognition of your work with these young people. Ford engineers plan to test exceptional projects such as radio-controlled planes, cars, boats, etc.

$50,000 in cash prizes

Winning students will share a total of $50,000 in cash prizes, with individual prizes up to $200.

In addition to this, there will be five special awards for projects displaying the most ingenuity in their conception . . . eleven special awards for projects with the most outstanding creative design.

Winning entries will be exhibited in selected areas throughout the country, and at the Ford Rotunda in Dearborn, Michigan—showplace of the automobile industry.

Winning teacher-student teams to be feted in Detroit

Three days of festivities will include a tour of the Rouge Plant, historic Greenfield Village, and seats at the Michigan-Michigan State Football game. A banquet for winners of Outstanding Achievement Awards and their teachers will climax the trip to Detroit.

Send this coupon for free IAA rules booklet and free entry blanks.

INDUSTRIAL ARTS AWARDS Dept. B

FORD MOTOR COMPANY, 3000 Schaefer Road, Dearborn, Michigan

Please send me official IAA rules booklet and entry blanks today.

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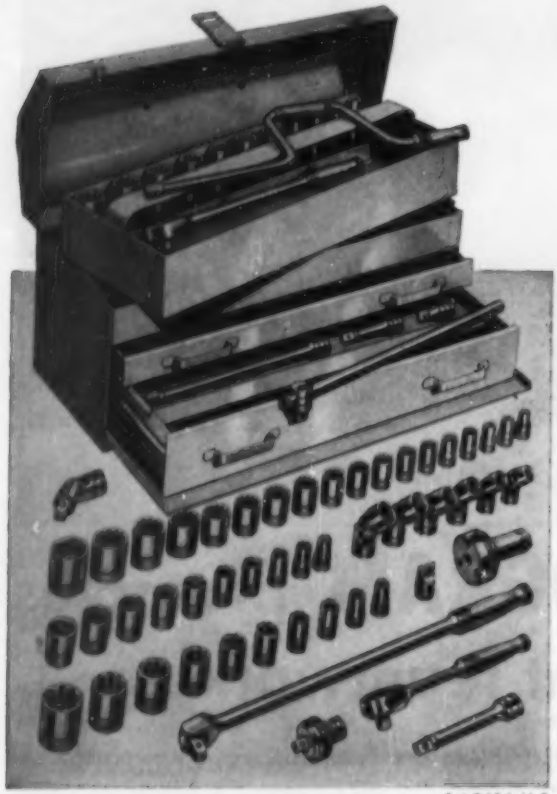
Snap-on* MASTER GENERAL SET



Set 368A-M-8

covers widest range of wrench operations

By far the widest range of nut turning operations, in both automotive servicing and in industry, are covered with this Master Wrench set—½" drive, wrench sizes from ⅜" to 1¼". With this set your students have at their finger tips every combination of handle, adaptor, extension and socket to speed any job. They quickly learn to use the *combination* that does each job better, faster, easier. The sturdy Mechanikit chest has tote-tray and drawers for orderly tool arrangement and safekeeping. This set is fully described in Snap-on's complete catalog of hand and bench tools. Free to school officials and instructors—write for your copy today.

*Snap-on is the trademark of Snap-on Tools Corporation

SNAP-ON TOOLS CORPORATION
8074-B 28th Avenue
Kenosha, Wisconsin

Let Paxton

supply you with the finest school shop lumber!

You'll find PAXTON offers you a *complete* selection of the very best KILN-DRIED
HARDWOODS - SOFTWOODS - PLYWOODS

Write to the Yard Nearest Your School for Your New Four-Color FREE CATALOG!

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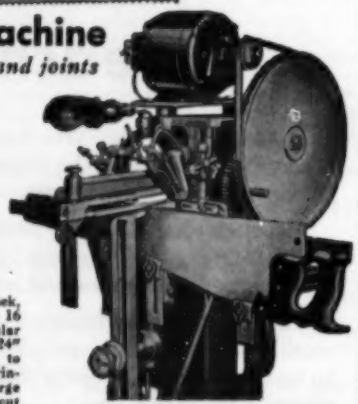
Box 683.....Des Moines, Iowa
Box 1225.....Fort Worth 1, Texas
6311 St. John Ave.....Kansas City, Missouri

SAW FILING

This ONE Machine

automatically files and joints



HAND, BAND, CIRCULAR SAWS

The Foley Saw Filer is ideal for sharpening saws used by students in school shops. It keeps them in tip-top shape, faster and better than by hand filing. Used by Army, Navy, hundreds of manual training departments and industrial plants. The Foley is the only machine that files and joints all hand, back, and mitre box saws from 3 to 16 points per inch, crosscut circular saws up to 16" diameter (24" optional), and band saws up to 24' long. Patented jointing principle automatically evens up large and small teeth, so saws cut faster, truer, cleaner — stay sharp longer. Foley filed saws have less breakage and last longer.

30-DAY TRIAL OFFER

You may have the privilege of using the Foley Saw Filer in your own shop for 30 days. Write or send coupon for details and list of school users.

TYPICAL SCHOOL USERS

Berea College, Berea, Ky.; Board of Education, Cleveland, Ohio; Boys Technical H. S., Milwaukee, Wis.; Charleroi School District, Charleroi, Pa.; Redlands Public Schools, Redlands, Calif.; Stout Institute, Menomonie, Wis.

FOLEY Automatic SAW FILER

FOLEY MFG. CO., 3318 N.E. 5th St., Minneapolis 18, Minn.
Please send information and Trial Offer on Foley Saw Filers.

Name.....
Address.....
School.....

NEW PUBLICATIONS

(Continued from page 20A)

The beginner can gain a real insight into the elements of layout work by carefully studying this book.

It is divided into eight parts which describe the purpose, functions of layout, and the scope, style, and shapes used in making layouts, and discusses working materials, techniques, lettering, thumbnail sketches, roughs, and visuals.

It also shows how to analyze the copy and evaluate the display importance, and explains the basic design requisites, allotment of white space, positioning of ornaments, etc.

It also contains a short study of types and shows how to fit copy. Lastly, it explains how to use color effectively, select paper stock, and how to mark the layout copy.

Audels Home Appliance Service Guide

By Edwin P. Anderson. Cloth, 824 pp., 5 by 6¾ in., illus., $4. Theo. Audel & Co., Publishers, 49 West 23rd St., New York City.

A very complete book on trouble shooting for electrical and gas appliance servicemen.

Its 34 chapters cover electrical fundamentals, resistance-heating appliances, motor-operated appliances, and gas-fired appliances.

Handweavers' Reference

By Mary E. Black. Paper, 94 pp. Published by the author at Box 14, Bedford, N.S., Canada.

This handy reference lists all of the most recent books on weaving and then outlines materials in print, available for the leading weaves, weaving operations and weaving materials. The reference is invaluable, especially for teachers of weaving.

Glass Reinforced Plastics

Edited by Philip Morgan. Cloth, 248 pp., 6¼ by 9¾ in., illus., $10. Philosophical Library, New York, N. Y.

A thorough scientific presentation of this material the application of which is primarily made in the automobile, aircraft, and boat-building industries.

The book contains chapters explaining the commercial molding processes, mass production, and design and properties of structure. There are a total of 15 chapters.

Projects in Metal for the Home and School Shop

Paper, 80 pp., 5½ by 8⅞ in., illus., 50 cents per copy in the United States, postage prepaid; 75 cents elsewhere. James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

The rapidly expanding Do-It-Yourself movement has had a new field opened to its enthusiasts by the introduction of an arc welding process which requires little skill to use, and which is practical for home operation. Because steel has now been made a material which can be used for home projects, the Lincoln Foundation is making this booklet of home projects available at small cost.

The projects include such things as: tree guard, stair railing, furnace, clothesline post, lawn furniture, wrought iron work, shop tools, air compressor, pipe bender, vise, ladders, stools, child's slide, swing, boat trailer, grill, and toy tractor. The book contains details for making 78 home projects in steel.

Business Management — Efficiency Surveys and Systems

By John A. Shubin. Paper, 372 pp., 5¼ by 8 3/16 in., illus., $1.75. Barnes & Noble, Inc., New York 3, N. Y.

One of the College Outline Series — No. 92.

This text is specially designed for business practice and management courses.

It describes management and industry; business organization and promotion; research products, products and physical facilities; output efficiency; operating business; industrial relations and compensation; and over-all administration and control.

Fundamentals of Electricity

By Wynne L. McDougal, Richard R. Ranson, Carl H. Dunlap, and Kennard C. Graham. Cloth, 415 pp., 5¾ by 8½ in., illus., $3.50. American Technical Society, Chicago, Ill.

A well-illustrated text with clear explanatory descriptions.

The book explains the nature of electricity, basic electrical quantities, Ohm's law, electrical circuits, magnetism and electromagnetism, primary and storage batteries, meters, resistance and power measurements, induced currents, generators, motors, and rectifiers.

The book also contains tables of various kinds, symbols, formulas, and a comprehensive dictionary of electrical terms.

180 Games for One Player

By J. B. Pick. Cloth, 137 pp., 5¼ by 8¼ in., $3.75. Philosophical Library, New York, N. Y.

This book of solo games for outdoor and indoor leisure occupation is interesting and enlightening especially for those who find themselves in the predicament of "not knowing what to do."

The outdoor games are divided into ball games, eye games, and tool and toy games.

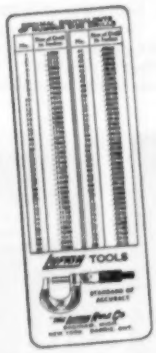
The indoor games are: board, table, and floor games, pencil and paper games, head games, and patience games.

Shop TEACHING AIDS...

yours for the asking from LUFKIN

"MICROMETER READING MADE EASY"
Interesting 12-page booklet is cleverly illustrated in cartoon style. Tells how to read to both thousandths and ten-thousandths of an inch. How to care for and adjust a micrometer.

"TIME SAVERS"
Circular slide rule type. Gives size of tap, threads per inch, size of tap drill, and decimal equivalents.



"DRILL CARDS"
Gives decimal equivalents of parts of an inch on one side, and decimal equivalents of number size drills on the other side.

"THE AMAZING STORY OF MEASUREMENT"
20-page four-color booklet traces the history of measurement from prehistoric times to the present. Interesting cartoon style.

USE THE COUPON BELOW

BUY LUFKIN TAPES • RULES • PRECISION TOOLS
From Your Regular Source of Supply
THE LUFKIN RULE COMPANY, Saginaw, Michigan
132-138 Lafayette St., New York City • Barrie, Ontario

ORDER A SUPPLY Adequate for Your Class Needs

299

THE LUFKIN RULE COMPANY, Dept. VE, Saginaw, Michigan
Please send me, without charge, shop teaching aids in the quantities indicated.
_____"Micrometer Reading Made Easy" _____"Drill Cards"
_____"Time Savers" _____"The Amazing Story of Measurement"
Name_____
School_____
Address_____
City_____ Zone_____ State_____

NEW IRWIN BIT*

SPEEDBOR "88"

Exclusive hollow ground point

steps-up efficiency of small ¼" electric drills

School Shops using small ¼" electric drills and drill presses can now speed-up class work, increase the boring range of present equipment. New Irwin Speedbor "88" wood bits cut cleaner and deeper with less power and in less time. Irwin's exclusive hollow ground point takes hold faster, new spade-type cutters keep holes clean and accurate. No binding, no clogging, no wobble—even in seasoned hardrock maple, plywood, or plastics.

Hardened Full Length

Forged in one piece from solid bar of special high carbon steel and hardened full-length to stay sharp much longer, last much longer. Easily resharpened with an ordinary hand file. Size markings shown on head for easy selection. Hang-n-Bit hole lets you store bits on nail or pin. Shank fits perfectly in 1/4", 5/16", 3/8" and 1/2" chucks. Sizes 6/16" to 16/16". Include Irwin's new Speedbor "88" on your next purchase requisition. The Irwin Auger Bit Co., at Wilmington, Ohio, since 1885. *Patent Pending

SPEEDBOR "88" Sets

Available in colorful red plastic roll kits. Individual pocket for each bit. Sets of 4, 6 or 11 bits store easily in tool chest or on shelf or work bench. As low as $2.98.

Free Booklet Tells How to Select, Use, Care for Auger Bits. A useful shop training guide. Send name and address to Irwin, Dept. 5B, Wilmington, Ohio.

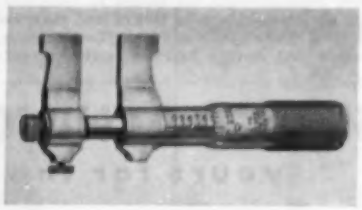
IRWIN the original solid center auger bit • screw drivers screw driver bits

SHOP EQUIPMENT NEWS

(Continued from page 34A)

NO. 700 INSIDE CALIPER

Precision measuring of hole diameters and linear dimensions between inside surfaces can be accomplished quicker and easier with a new inside micrometer caliper developed by The L. S. Starrett Company. No. 700 Inside Micrometer Caliper combines the convenience and quick-reading features of a micrometer with vernier caliper-style jaws.



No. 700 Inside Caliper

This micrometer caliper has a range of 1.000 in. to 2.000 in. by thousandths of an inch. The jaws are hardened for resistance to wear and ground on a radius for more accurate *feel* without cramping. No-glare *Satin Chrome Finish* eliminates glare and eyestrain, and makes the tool easy to read in any light. It also resists stains, corrosion, and rust.

Other features include: quick reading figures with every thousandth numbered, one piece spindle with hardened threads ground from the solid and stabilized, lock screw.

(For Convenience Circle Index Code 0207)

NORTHERN HARDWOOD LEGS

Hardwood furniture legs, with which anyone can make professional looking furniture, are now available from the Econoway Corporation.

These furniture legs are made of northern hardwood, laminated-to-shape, not bent. They come completely machined, ready for finishing as desired.

Hardwood Furniture Legs

The curve at the top of the leg makes it easy to obtain maximum strength at the junction of leg and table tops or chair seat. Econoway legs were designed by a leading furniture designer and are gracefully proportioned, making them ideal for building dining tables, benches, lamp stands, TV stands, and other furniture pieces.

Econoway also has complete kits which in-

(Continued on page 26A)

MAKE SHOP TRAINING EASIER WITH THESE U.S. GOVERNMENT FILMS!

INSPECTION OF SHEET METAL PARTS

OE 145 *20 min.* *$38.59*

How to plan an inspection routine; inspect sheet metal parts in detail; make visual inspections and spot checks.

(Correlated filmstrip, 42 fr., $1.25)

THE ELECTRON: AN INTRODUCTION

OE 175 *16 min.* *$33.46*

Nature of electrons; electron flow in solid conductors; electromotive force; types and control of electron flow; electron flow and magnetic fields; and induced electron flow.

(Correlated filmstrip, 40 fr., $1.25)

THE TRIODE: AMPLIFICATION

OE 177 *14 min.* *$30.85*

Principles of the diode and triode; electric fields; a triode amplifier circuit; amplification of D.C. voltage changes; alternating voltages; distortion; amplification of audio frequency signals.

(Correlated filmstrip, 36 fr., $1.25)

SPLIT-PHASE MOTOR: REWINDING

OE 394 *28 min.* *$49.07*

How to test a split-phase motor for electrical and mechanical faults; dismantle and strip the stator; rewind the stator; form and install skein windings; insulate; lace, dip, and bake the stator; and assemble, lubricate, and test the motor.

(Correlated filmstrip, 40 fr., $1.25)

SPOT WELDING

OE 295 *20 min.* *$38.59*

How to spot weld parts of an access cover; set up the machine; remove and install electrodes; set pressure, current, and time controls; test the setup; and clean the electrode tips.

(Correlated filmstrip, 44 fr., $1.25)

THE ENGINE ASSEMBLY

OE 463 *19 min.* *$36.89*

How to check the cylinder head and block; intake and exhaust manifolds; under-chassis parts; valve mechanism and tappets; vents, screws, and air filters; oil filter and oil lines; and cylinder depression.

(Correlated filmstrip, 42 fr., $1.25)

Order through Government Dept. GO-5, United World Films, Inc. Prices F.O.B. New York City. Special discounts for schools and non-profit organizations. Write for FREE catalog.

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ELECTRONICS

easy to teach
. . . easy to learn

with the New, Low Cost

CROW Basic Electronics Kit Model 50-A

Here is a unique combination of equipment and text material designed to bring electronic instruction to every school. You can now teach electronics by *visual experiment*—the same effective method that has made Crow Electri-Kits standard equipment in schools from coast to coast.

This new kit is for students who have completed the Beginners' Electricity course with Crow Electri-Kit Model 41-B or its equivalent. It permits them to advance immediately into the study of electronics. They learn by *doing;* that is, they verify electronic principles by building their own operating assemblies. No other method arouses student interest so quickly nor demonstrates so vividly how abstract principles are put to practical use.

Nothing Else to Buy

Model 50-A contains 82 precision-made components—everything needed to perform 60 experiments in electronic fundamentals. Do not be misled by the kit's low price . . . this is *quality* equipment. If the components were purchased individually, they would cost you several times as much.

Included with the kit is a 275-page, illustrated manual in work-sheet form, *Experimental Electronics for the Beginner,* by Leonard R. Crow. It guides students step-by-step . . shows what parts are needed for each assembly, how to set up the experiment and the practical applications of the theory involved.

Simplifies Teacher's Job

If you are familiar with basic electrical principles, you can teach electronics easily with Model 50-A. There are no difficult mathematical formulas to solve. Manual outlines the entire course for you . . . eliminates tedious class preparation.

60 Operating Assemblies

Capacitors and Capacitance • Voltage Dividers
Frequency Discriminators • Frequency Multipliers
Vibrators • Electrical Indicating Instruments
Rectifiers • Resonant Circuits • Time Constants
Filters • Fly-back Voltage Supply Principles

YOU TEACH BY "VISUAL EXPERIMENT"
YOUR STUDENTS LEARN BY DOING

IMPORTANT:

Model 50-A gives the student a firm foundation for specialized training in his choice of three major electronic fields:

1. **Radio Transmitting and Receiving**
2. **Industrial Electronic Circuitry**
3. **Basic Radar & Television Circuitry**

These principles are covered in the Crow Electronic Tubes, Circuits and Devices Kit (Model 53) available soon.

Crow Basic Electronics Kit Model 50-A
82 parts including precision meter (±1%), precision resistors, coils, potentiometer, rectifiers, capacitor bank, etc., plus 275-page manual. All parts mounted for use with "Kwik-Klip" solderless connectors. Supplied in sturdy corrugated case . . **$87.50**

Hardwood Carrying Case
For Model 50-A. Has pegboard top and slip hinges. Can be used as baseboard for experiments **$8.75**

Crow Basic Electronics Kit Model 50-B
For those who already own Model 41-B Electri-Kit. Same as model 50-A (above) with all 41-B components omitted . **$57.50**

BUILD YOUR ELECTRICAL AND ELECTRONIC COURSES AROUND CROW "VISUAL EXPERIMENT" EQUIPMENT

Write for illustrated bulletins describing the new Crow Basic Electronics Kit and it's companion kit, the famous Crow Electri-Kit Model 41-B for Beginners.

CROW ELECTRI-CRAFT CORP.

DIVISION OF UNIVERSAL SCIENTIFIC CO., INC. | BOX 336G, VINCENNES, INDIANA

SHOP EQUIPMENT NEWS

(Continued from page 24A)

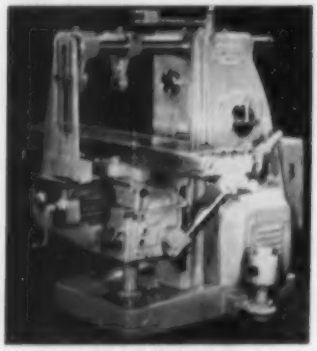
clude tops, legs, and hardware. Also available is a comfortable, attractive chair in kit form.

Descriptive literature and prices are available upon request.

(For Convenience Circle Index Code 0208)

THE NEW KEARNEY AND TRECKER MILLING MACHINE

Introduction of the new Model CE milling machines combining quality with low initial cost has been announced by the Kearney & Trecker Corporation.



K. and T. Milling Machine

The new machines offered in both plain and universal styles, are ideally suited for those users who face budget restrictions. The machines can be obtained under the Kearney & Trecker Tool-Lease plan, according to the manufacturer.

Immediately available are the No. 2 (3 h.p.) or No. 3 (7½ h.p.) size. Both sizes feature 16 quick-change speeds (25 to 1300 r.p.m.) and feeds (½ to 25 r.p.m.) The CE is ideally suited for a wide variety of applications, especially for small tool shops, repair and maintenance shops, and vocational training schools.

(For Convenience Circle Index Code 0209)

NEW HIGH-SPEED BAND POWER SAW

The DoAll Company has just recently produced a new type power cutoff saw.

DoAll High Speed Band Saw

The new power saw has a number of exclusive adjustments and hydraulic controls for feed pressure, band tensioning, an infinitely variable speed change, and is available with either manual or completely automatic stock indexing.

Adding to its efficiency are the inherent advantages of the band machining method, the use of a continuous band tool moving always in a cutting direction; distribution of wear over hundreds of teeth for relatively longer tool life, and an appreciable savings in material because of the narrower path cut by the more slender saw band.

Further information is available.

(For Convenience Circle Index Code 0210)

NEW PLASTIC HEADSHIELDS

Two new molded fiber glass plastic headshields for the head protection of welding operators are being announced by Hobart Bros. Co.

Made of fiber glass reinforced plastic, reported to be the strongest protective material per ounce of weight, these shields offer the

(Continued on page 28A)

Plastic Headshields for the protection of welders

3-IN-1 LIFETIME EFFICIENCY

FLEX-MASTER

6 STUDENT DRAWING TABLE

IN A CLASS BY ITSELF!

Manufacturers of Lifetime Steel Blue Print Filing Cabinets, Drafting Tables, Tracing Tables, etc.

It's a LIFETIME* STEEL DRAWING TABLE . . . a BOARD STORAGE UNIT . . . a TOOL STORAGE COMPARTMENT. Equipped with selected soft wood adjustable top; large all steel center drawer; 6 master-keyed, individually locked tool drawers. Holds 6 boards up to 20" x 26". Rigid welded steel construction stands up to abuse from the crowded classrooms it comfortably serves.

Baked hammertone grey enamel finish. 37" high. Many board sizes. Also available with steel or hardwood tops.

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attention shop teachers

Here's the Widest Assortment of Top Quality Products in Hardware • Machinery Tools • Metals for Woodworking and Metal Working Shops

Patterson Brothers—one of the oldest and most reliable names in the business—is again ready to supply your every shop need with outstanding quality and service.

Our new school shop catalog will be available early in 1955. It's going to be outstanding, complete and entirely new! Get your name on the list now. In the meantime, check our prices and compare our service.

It's *smart* to buy BLUE RIBBON lines from a BLUE RIBBON source . . .

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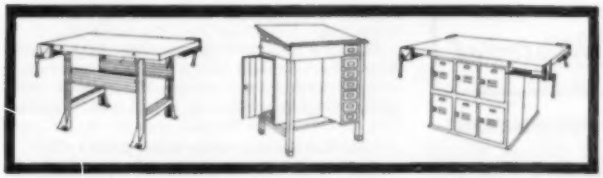

lick storage headaches

BENCH SIZE
72" L., 24" D.,
33¼" H.
TOP
1¾" Laminated Maple
LOCKERS (8)
12" W., 21" D.,
15" H.

No. 72-24-400B
Work Bench

Individual storage lockers keep working surface clear for action! Locker doors are equipped with exclusive spring hinges for automatic closing. Get all the facts TODAY . . . compare with other benches . . . you'll specify PARENT for your next shop installation!

Send for School Catalog!

PARENT METAL PRODUCTS INC.

Locust at Fourth St. Dept. V-4 Philadelphia 6, Pa.

McGraw-Hill Publications in Industrial Arts

Industrial Arts Drawing and Blueprint Reading

Coover. A new book for beginners, stressing student planning. Offers real projects that junior high school students really make. Correlates drawing and shopwork directly.

General Metals

Feirer. Gives students broad experiences in the fundamentals of metalwork and related information on equipment, tools, materials, and occupational opportunities. 62 units.

General Shop

Groneman and Feirer. Covers all important areas and contains 98% of what 538 expert teachers asked for in a general shop text. Includes drawing and planning, woodworking, metalworking, electricity, plastics, leathercraft, and home maintenance.

General Woodworking

Groneman. The 1955 Edition contains fresh, new exciting projects. Presents basic information and material on hand tool processes and the more widely used school power machines.

Also for Industrial Arts

Drawing, Sketching, and Blueprint Reading

Coover. Teaches the student to read industrial drawings and then to make accurate, legible drawings and sketches, with facility and ease. Functional, dynamic, and adaptable.

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high-quality tools by Greenlee

for accurate shopwork

The minute you take hold of a GREENLEE tool, you can "feel" the fine quality and extra craftsmanship that go into its making. All GREENLEE tools are carefully formed and finished for accuracy and correct cutting edges. All are properly heat-treated for strength and long life.

GREENLEE 22 SOLID-CENTER AUGER BITS bore *accurate* holes smoothly, quickly. Solid-center design gives extra strength and provides fast, positive chip clearance. Every GREENLEE 22 Auger Bit has accurately sized, perfect cutting edges that last through long use. "Plastic Sealed" to reach you factory-sharp. Available in 18 sizes: from 4/16" diameter through 24/16". Buy singly or in sets . . . in handy plastic rolls, steel boxes, or metal folding panels.

CHISELS, GOUGES Various types of tang butt, socket butt and firmer chisels. All are carefully balanced, easy to hold. Blades are of selected tool steel that long retains its fine-cutting edge. Green plastic handle provides comfortable, sure grip. Buy singly or in sets. GREENLEE socket gouges available with inside and outside bevels . . . same top quality as all GREENLEE tools.

TOOLS FOR CRAFTSMEN
GREENLEE

The GREENLEE tool line also includes expansive bits, electric drill bits, turning tools, drawknives, and many more. Write for literature. Greenlee Tool Co., 2022 Twelfth St., Rockford, Ill.

SHOP EQUIPMENT NEWS

(Continued from page 26A)

user lighter weight comfort with complete head protection from the welding arc and spatter. Fiber glass plastic is durable, heat and moisture resistant, and its smooth, attractive surface is easy to clean.

Type 971 has the lens holder molded right into the shield to eliminate light leaks and to further reduce the weight.

Type 973 is of the same general design and plastic construction, except has a lift front lens holder to permit the operator to view, chip, and clean the weld without raising the hood. Both shields are equipped with Federal Specification lens.

(For Convenience Circle Index Code 0211)

Descriptive Material

NEW DELCO-REMY PUBLICATIONS

Delco-Remy Division of General Motors announces two new publications — the 1955 edition of the booklet *12-Volt Electrical Equipment for Passenger Cars*, and a new set of *12-Volt Training Charts*.

The booklet contains a description of Delco-Remy 12-volt automotive electrical equipment used on passenger cars. Recommendations for periodic servicing, checking, and adjusting of the charging, starting, and ignition systems are discussed. Other miscellaneous electrical equipment such as horns, overdrive electrical units, a power steering generator, and a new lighting switch are also described. The booklet contains 20 pages and 44 illustrations. Free in limited quantities.

The *12-Volt Chart Set* consists of 14 26 by 36-in. charts bound into a set. Charts are enlarged pictures of various illustrations and wiring diagrams found in the 12-volt booklet. The charts cost $5 per set.

(For Convenience Circle Index Code 0212)

NEW ATKINS CATALOG

Atkins Saw Division of Borg-Warner Corporation has published a new catalog which eliminates useless wordage and presents in an easy-to-read manner all the necessary information about their product. Designed as a *working catalog*, it goes so far as to tell where each saw is used, who uses it, and to what advantage.

A handy pocket-size hardware catalog, complete and equal in content to the full-size catalog, is also available as a ready reference for buyers and salesmen as well as for customers.

(For Convenience Circle Index Code 0213)

NEW HIGH SPEED KODAK ROLL FILMS

The Eastman Kodak Company has introduced a new, high speed, roll film — Kodak Tri-X.

The film is approximately twice as fast as the company's current Kodak Super-XX Film, and is intended for amateur, business, industrial, and professional use.

The new film will be available in 35mm., 4 by 5 film pack, and 620 and 120 roll film sizes. The company plans to offer the film in all popular roll and pack sizes eventually, but the introduction dates for additional sizes have not yet been determined.

The company recommends that the new Tri-X film be processed in such standard Kodak developers as D76, Microdol, or DK-50.

(For Convenience Circle Index Code 0214)

NEW STANLEY TOOLS AND PATTERNS

Stanley Tools, in its latest issue of Stanley Home Workshop News, presents a number of helpful aids to the hobbiest, to the do-it-yourself handyman, and to the shop teacher.

There is, for instance, a test for determining the tool I.Q. of the student or the home handyman. Then there is a useful tool board, and dozens of descriptions of excellent tools which would delight anyone interested in woodwork.

Stanley Tools also announces new plans for conservative modern furniture which is simple in design yet beautiful in appearance.

(For Convenience Circle Index Code 0215)

TITANIUM FOIL

Titanium foil rolled to very close tolerances and thin gauges is completely described in free Technical Data Bulletin No. 100, published by the American Silver Co., Inc.

The Bulletin describes commercially pure titanium foil now being produced on Sendzimir mill equipment. It includes mill limits, tolerance chart, composition of commercially pure grade titanium foil, mechanical and electrical properties.

The Bulletin also includes data on welding, brazing, annealing and forming of titanium foil, and a list of suggested applications to aircraft, chemical, electrical and electronics industries.

(For Convenience Circle Index Code 0216)

NEW CATALOG ON HAND TORCHES

Air Reduction is offering a new 36-page catalog covering their complete line of torches

Need Supplies for the Second Semester?

Use this handy B-G order blank for consumable items

Tear out, clip to your letterhead, and mail

B-G FEBRUARY-MARCH SPECIALS

Quantity	Immediate Shipment	Unit Price	Total
	board ft. 1" Hard Maple Rgh. or S2S	$ .28 bd. ft.	
	board ft. 1" Philippine Mahogany Rgh. or S2S	.36 bd. ft.	
	board ft. 1" Willow Rgh. or S2S	.25 bd. ft.	
	gallons of Franklin's Glue	5.00 per gal	
	gallons of Shellac (white)	3.60 per gal	
	1 lb. can Garrett's Polish Wax	.55 per can	
	gallons VII Garrett's Cabinet Varnish	3.95 per gal	
	.00 sheet pack Sandpaper (fine)	1.70 per pack	
	.00 sheet pack Sandpaper (medium)	1.90 per pack	
	.00 sheet pack Sandpaper (coarse)	2.40 per pack	
	gross 1 x 8 Flat head Steel Wood Screws	.55 per gr.	
	gross 1¼ x 8 Flat Head Steel Wood Screws	.58 per gr.	
	gross 1½ x 8 Flat Head Steel Wood Screws	.64 per gr.	
	No. 122 med. grade Flat Varnish Brush 1"	.39 ea.	
	No. 122 med. grade Flat Varnish Brush 2"	.65 ea.	
	10" Fast Cut Combination Disposable Saw Blade	3.55 ea.	
	Melt Former Kit, complete	28.00	
	reams Garrett's No. 35 cream Drawing Paper (9 x 12)	3.75 per ream	
	reams Garrett's No. 35 cream Drawing Paper (12 x 18)	7.40 per ream	
	reams Garrett's Acacia Drawing Paper (9 x 12)	3.75 per ream	
	reams Garrett's Acacia Drawing Paper (12 x 18)	7.40 per ream	
	Garrett's No. 100 Super Box	2.55 ea.	

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50 Years Serving School Shops of America

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and tips for oxyacetylene cutting and welding.

Every Airco standard torch and tip is listed along with the necessary mixers, extensions, adapters, and accessories that are used with the torches. Complete information is presented through carefully planned illustrations, charts, and descriptions.

Request a copy of this catalog, ADC 702B, by writing to *Air Reduction Sales Company*.

(For Convenience Circle Index Code 0217)

NEW BRAKE GUIDE

A new 16-page Brake Manual illustrating how a single Di-Acro Brake can be converted into a Bar Folder, Tab Former, Radius Former, Open End Brake, Standard Brake, or Box and Pan Brake, simply by changing the Top Forming Bar has been announced by O'Neil-Irwin Manufacturing Company.

Entitled "Handy Guide to Aid in Selecting and Operating Di-Acro Brakes," this manual contains more than 35 photos and diagrams showing the variety of ways the ten models of Di-Acro Standard, Box Finger, and Radius Brakes can be set up.

Specifications and capacities on all Di-Acro Brakes are listed in handy table form for easy reference. Capacity of all Di-Acro Brakes is 16-gauge mild sheet steel.

(For Convenience Circle Index Code 0218)

ATLAS MODERN FURNITURE PLANS

The Atlas Press Company have just recently published an interesting 36-page book of 16 modern furniture woodworking plans.

These designs are the work of a commercial furniture designer, and describe the following projects: planter end table, modern living-room chair, sofa, kneehole desk, corner table, contemporary table lamp, server, china top, contemporary cocktail table, kitchen table, kitchen chair, dinette chair, drop leaf table, room divider deck, buffet room divider, and table lamp.

Each project is accompanied by step-by-step directions, a complete list of materials, a dimensioned drawing, and directions for finishing.

(For Convenience Circle Index Code 0219)

Business and Personal News

NAMED PRESIDENT OF CLEVELAND WELDING COMPANY

Samuel Sloan Auchincloss, president of DeWalt Inc., of Lancaster, Pa., has been named president of Cleveland Welding Company succeeding William A. Sipprell, Jr., who has resigned. Both firms are American Machine & Foundry Company subsidiaries. Mr. Auchincloss will continue to serve as president of DeWalt.

NEW PRESIDENT ANNOUNCED

J. J. Gallagher was recently elected president of the Yates-American Machine Company, Beloit, Wis. Mr. Gallagher was formerly vice-president, and succeeds E. J. Dalton who held the positions of chairman of the board and president.

Mr. Dalton will continue as chairman of the board.

CARL W. PETERSEN ELECTED VICE-PRESIDENT

Carl W. Petersen was elected vice-president and works manager of Dodge Manufacturing Corporation.

This announcement is coincidental with the retirement, under the regular Dodge retirement plan, of Edgar M. Carver as first vice-president of Dodge, a Mishawaka, Ind., manufacturer of power transmission machinery. He will continue to serve as a member of the board of directors and has been appointed by that board to act as a consultant to the corporation. Mr. Carver has been associated with Dodge for over 45 years.

Carl Petersen moves forward from the position of general superintendent after serving in that capacity since 1942.

CHARLES G. MONNETT, JR., HONORED

Charles G. Monnett, Jr., F.I.M. Wood. T., Greensboro, N. C., has recently received the honor of being the only person outside the British Commonwealth to be accepted for membership in the Institute of Machine Woodworking Technology.

Mr. Monnett was appointed a Fellow, which is the highest position in the Institute. This appointment was made on the basis of his having held a responsible industrial position in the woodworking field for a period greater than six years and having given distinguished service to the technology of woodworking. Monnett is sales manager for Dependable Machine Company, Greensboro, N. C.

THE NEW BOICE-CRANE MASTER-MONOTROL* 10-INCH TILTING ARBOR SAW

• CUTS A BOARD PLUMB SQUARE!
• RIPS SUPER STRAIGHT!
• CUTS MITERS THAT REALLY FIT!

Not to be confused with 10-inch saws of questionable quality and dubious accuracy designed for homecraft use only!

SPECIFICATIONS

SAW BLADE TRAVEL: 0 to 3¼"
ARBOR SPEED: 4000 rpm's
CAPACITY: Cuts off 15" wide, 1" thick
Cuts off 13⅜" wide, 3" thick
Rips to center of 6 ft. wide stock
POWER: To 2 HP 3-ph., to 1½ HP 1-ph.
ARBOR: ¾" dia.
TABLE SIZE: 36" wide x 27½" long with extensions

MEETS EVERY DEMAND FOR CAPACITY, LONG LIFE, STURDINESS

Produces Superior Cabinet Work — Better for all Commercial Woodworking. Guarantees Permanent Accuracy, even with abusive use.

ENTIRELY NEW TYPE TRUNNION

Exclusive with Boice-Crane. All critical parts, support surfaces, bearings and contacts are oversize, extra rugged. Many parts actually equal in size to those on 12-inch saws.

SINGLE CONTROL FOR POSITIONING BLADE

New Monotrol* saw blade positioning system reduces blade controls to a single large handwheel, plus a height lock and a tilt lock, all mounted on the *front* — equally convenient for right-handed or left-handed operators! No groping, no out-of-reach controls, fewer accidents, an amazing saving of time on variety work. 5% to 29% faster blade speed. Cuts faster, cleaner, smoother. Up to 44% more ripping capacity without extra attachments.

33⅓% TO 50% MORE POWER

Heretofore, enough power to cut full 3" hardwood in production was usually available only in 12-inch saws. In a Master-Monotrol* you have a selection of motors offering from a third to a half more power than others accommodating only small frame motors. Boice-Crane full powering guarantees freer sawing, reduced hazard of accidental kickbacks when freeing stock from a choked blade.

OTHER NEW FEATURES:

Overhung arbor pully for quicker belt changing and without tools • Power-packed 3 V-belt drive and larger pulleys • Start-stop switch which accidental manipulation can turn only "OFF," never "ON" • Blade tilt to left — the safest way for right-handed operators • Steel, all-purpose insert serves saw blades, and dado heads as well without constant interchange, and without extra cost • Ground cast-iron fence with entirely new micro-control, and easier foolproof adjustments • 37 inches maximum fence to blade, 44% more ripping capacity than most 10-inch saws.

Now, there really IS a new and BIG difference in saws.

BOICE-CRANE COMPANY

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Please send complete details on the Master-Monotrol.*

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SCHOOL .....
STREET .....
CITY & STATE .....

*Tradename Reg.

5 NEW BOOKS FOR '55

American Technical Society presents five additions to its number of outstanding texts and technical books. We'd like you to see them. Order today on 30 day trial.

1. SCHOOL AND COMMUNITY PARTNERSHIPS. *Leighbody, Sommers, Gilson, Prakken, Diamond, Barich, Goldsmith.* The second *Professional Educators' Book Club* selection. *Price:* $3.00

2. SAFE PRACTICES IN WOODWORKING AND PLASTICS. *G. Harold Silvius, Gerald Baysinger, K. T. Olsen.* Newly revised to include latest advancements in safety education. *Price:* $1.00

3. FARM SHOP SKILLS IN MECHANIZED AGRICULTURE. *Harry O. Sampson, Albert S. Mowery, Harold L. Kugler.* A farm shop text as up-to-date as tomorrow's farmer. *Price:* $4.95

4. BASIC MEDICAL TERMS AND TECHNIQUES — SIMPLIFIED. *Minnie I. Paddock.* Terminology and setups are listed for vocational-practical nurses and medical attendants. *Price:* $3.50

5. INTERIOR ELECTRIC WIRING AND ESTIMATING — PART II, INDUSTRIAL. *Kennard C. Graham.* This volume solves your commercial wiring problems. *Price:* $4.95

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Shop Equipment News

NOTICE TO READERS

Use the easy method of getting information on any of the items described in the shop equipment news. Circle the index code number or numbers on the business reply card found on the last page of this magazine.

DELTA METALWORKING LATHE

A new 11-in. metalworking lathe to bring industrial precision and speed into the schoolroom was introduced this month by Delta Power Tool Division of Rockwell Manufacturing Company.

It is a cabinet model variable speed drive 11-in. lathe with 24-in. capacity center to center and 1-in. collet capacity. Diameter of the hole through the spindle is 1⅛ in.

New Delta Metalworking Lathe

A patented back gear shift lever is located on the front of the machine within easy reach of the operator at all times. This lever eliminates any need for using wrenches, pulling out pins, or opening guards to shift from direct spindle drive to back gear spindle drive, loose or locked spindle.

The new lathe has a vari-speed drive offering a speed range of 44 to 1550 r.p.m. with an infinite choice within that range. Speeds can be changed without turning off the machine.

The spindle is carried on two tapered roller bearings on the inboard end and a floating sealed ball bearing on the outboard end.

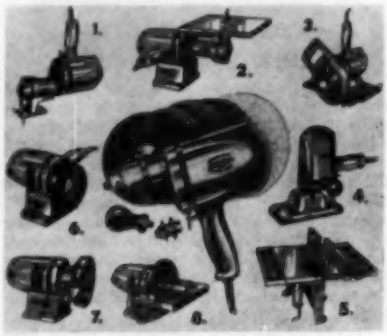
The new Delta lathe also has quick-change, nonjamming feed controls easily accessible to the operator, which offer a total of 48 thread and feed changes with thread range from 4 to 224 and feed rate range per revolution from .0902 to .0016 in. longitudinal and .0301 to .0005 in. cross.

A full line of accessories, including a new durable taper-turning attachment designed for accuracy and easy manipulation, also micrometer stops, milling attachments, and a standard type of collet chucks, are available.

(For Convenience Circle Index Code 0201)

ATTACHMENTS CONVERT POWER UNIT INTO A WORKSHOP

Shown here is the new Millers Falls "Dyno-Mite" 888 Power Unit and the beautifully engineered attachments which quickly convert it into a first-rate power workshop. All are designed and made by the Millers Falls Company.



Dyno-Mite No. 888 Work Shop

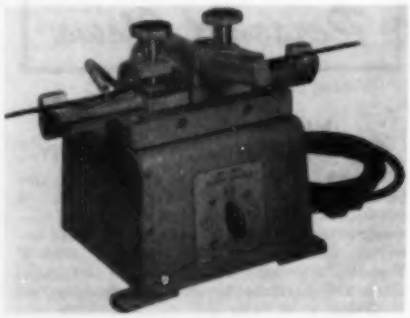
It is completely equipped as a three-in-one combination tool — a ¾-in. drill, a 6-in. polisher, and a 6-in. sander — a basic unit with its powerful motor. Eight sturdy attachments are available separately and include a portable jig saw, a bench jig saw, a portable saw, an orbital sander, a 6-in. portable saw, a bench stand, a disk bench sander and a 4-in. bench grinder.

Each attachment is direct-driven from the spindle of the 888 Power Unit and performs favorably in comparison with any equivalent single-purpose power tool. Collectively this set of Millers Falls tools is named the "Dyno-Mite Power Workshop."

(For Convenience Circle Index Code 0202)

OLIVER NO. 562 ELECTRIC BAND SAW BRAZER

The Oliver Machinery Company have just produced the new "Oliver" Electric Brazer which utilizes the electric heat of resistance for melting down the soldering metal.



No. 562 Oliver Band Saw Brazer

This electric brazer is regularly furnished for single phase 50 or 60 cycle, 110-, 220-, or 440-volt alternating current as specified. For two or three phase power lines, 50 or 60 cycles, special wiring from switch to power line is essential. The brazer is not made for direct current.

(Continued on page 32A)

SPECIAL WORKSHOPS AND COURSES IN INDUSTRIAL EDUCATION

Minnesota SUMMER SESSION

LIBRARY, LABORATORY, and RESEARCH facilities of highest quality.

SPECIAL WORKSHOPS and INSTITUTES IN—
Government and Politics
Family Life
Biological Sciences
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Chemistry
Industrial Education
Humanities
Speech
and many others

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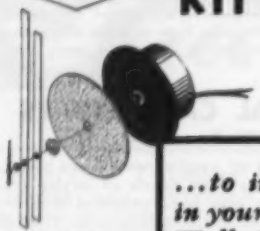

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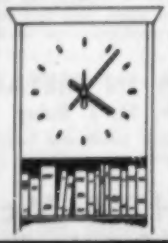

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No. 15

SPECIFICATIONS

Model No.	Working Space	Overall Size
15	18"Lx5"Wx2½"H	21"Lx7"Wx3½"H
16	30"Lx5"Wx2½"H	32"Lx7"Wx3½"H

Wattage 115 Volt	Shipping Weight	Price
200 W	4 lbs.	$15.00
350 W	6 lbs.	25.00

THE ELECTRIC Hotpack COMPANY, INC.

5067 Cottman Ave. Philadelphia 35, Pa.

SHOP EQUIPMENT NEWS

(Continued from page 30A)

These brazers need no preparation, are always ready for work and require only insignificant consumption of current because the brazing process takes only a few seconds.

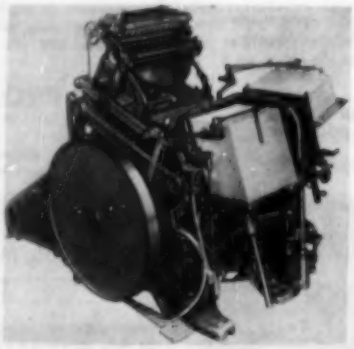
Two spring devices hold back edge of blade against the back rail to insure a perfectly straight braze.

(For Convenience Circle Index Code 0203)

NEW CHANDLER AND PRICE CRAFTSMAN PRESS

A new platen press in 10 by 15, and 12 by 18 sizes called the *New Craftsman* has just been announced by Chandler & Price Company.

Designed with a new side delivery of printed sheets, this press has many new features for faster production and improved operating efficiency. Speeds for the 10 by 15 are up to 4500 per hour; for the 12 by 18 up to 4000 per hour.



New C & P Craftsman Press

It handles the same size pile of stock — up to 14 in. — on both feed and delivery tables, and larger sheet sizes — up to 11 by 17 on the 10 by 15 and up to 13 by 19 on the 12 by 18. It has a right or left register; printing two-up to register, and an automatic throw-off if sheet fails to feed with automatic throw-on when sheet is fed; infinite variable speed; dual type impression controls; and ability to print envelopes and forms as small as No. 88 card with two-up attachment furnished as standard equipment.

The press has a one-piece frame; drop-forged side arms which pull the platen onto impression; filtered air intakes; double rotary pump; plastic air hose; V-belt drive; oversize brake; and flywheel integral with drive pulley. Press and feeder are delivered as a complete unit.

(For Convenience Circle Index Code 0204)

NEW CONNECTICUT BENCH BRAKE

A new Connecticut Bench Brake designed specifically to meet vocational training and home workshop needs, is being introduced by W. Whitney Stueck, Inc. Designated as the Model HW Bench Brake, this machine will bend mild steel sheets up to 22 gauge (.032 in.) thick, and correspondingly heavier sheets in softer material such as aluminum. The maximum length of bend is 24 in.

The Model HW Brake is accurately made, substantial, and capable of professional quality sheet-metal work. Clamping and bending surfaces are machined to close tolerances. The apron, or bending member, pivots on bronze pins. Clamping pressure is obtained by heavy,

(Continued on page 34A)

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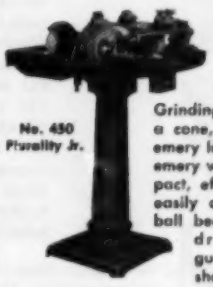

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SHOP EQUIPMENT NEWS

(Continued from page 32A)

Model HW Bench Brake

forged wing nuts, and accurate adjustment for thickness of material is provided by knurled screws and lock nuts.

A feature of this machine is the slotted beam, or clamping member, which makes it possible to form boxes and pans to a depth of 1½ in. The slots are spaced so that boxes dimensioned in even inches up to 24 in., are feasible.

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(For Convenience Circle Index Code 0205)

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Metal Components for Furniture

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(For Convenience Circle Index Code 0206)

(Continued on page 24A)

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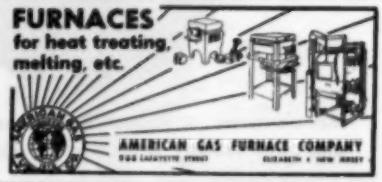

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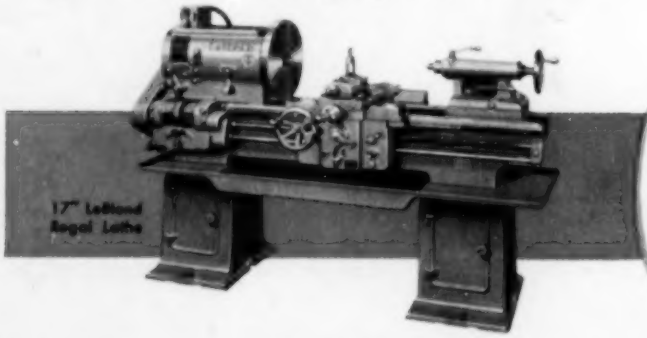

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